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ABSTRACT

Available information, largely for selected years in the 1970s through 1990, on academic performance at the highest levels of achievement is summarized for elementary through graduate school levels. Profiles of students who performed well on particular measures of academic achievement or attained advanced degrees are provided. Data were obtained from testing programs administered by the Educational Testing Service including statistics from the National Assessment of Educational Progress. At the elementary school level (9 year olds), the level of highest achievement in reading, mathematics, and science has not varied greatly from assessments in the 1970s. At the junior high school level (13 year olds), it was apparent that achievement in mathematics and science lags behind some other countries. At the high school level, few students demonstrated high levels of performance. More associate's and bachelor's degrees were awarded in 1988 than in 1978, but fewer master's degrees were granted. The increase in doctoral degrees and first professional degrees did not keep pace with population growth. Thirty-nine figures illustrate students' performance. An appendix contains 21 tables of supplemental data. (SLD)

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POLICY INFORMATION REPORT

# PERFORMANCE AT THE TOP:

## FROM ELEMENTARY THROUGH GRADUATE SCHOOL

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NOTE TO READERS

**A summary of this report appears on pages 56 to 58.**

*Each performance indicator is presented in sequence from elementary school through graduate school on two facing pages. On the right page, a brief summary is provided in a box above a graphic or chart. On the left page, a more complete description of the data is provided along with, in some cases, technical notes.*

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CONTENTS

Preface . . . . . 1
Acknowledgements . . . . . 1
Introduction . . . . . 2
Elementary School
9-Year-Old Reading . . . . . 4
9-Year-Old Mathematics . . . . . 6
9-Year-Old Science . . . . . 8
Junior High School
13-Year-Old Reading . . . . . 10
Eighth Grade History and Civics . . . . . 12
13-Year-Old Math and Science . . . . . 14
High School
17-Year-Old Reading, Math, and Science . . . . . 16
12th Grade Civics and History . . . . . 18
12th Grade Writing . . . . . 19
Advanced Placement Participation . . . . . 20
High School to College
College Admissions Tests . . . . . 22
Achievement Tests of the Admissions Testing Program . . . . . 24
Educational Pathways of High School Seniors, 1972 and 1980 . . . . . 26
Educational Pathways of High School Seniors, 1980 and 1987 . . . . . 28
Educational Pathways of High Ability Seniors . . 30
Bachelor Level Education
Graduate Record Examination General Test . . . . 32
Graduate Record Examination Subject Tests . . . . 34
Graduate Management Admissions Test . . . . . 36
Bachelor's Degrees . . . . . 38
Graduate Education
Graduate Education . . . . . 40
Master's Degrees . . . . . 42
Doctoral Degrees . . . . . 44
Degree Attainment by US Citizens . . . . . 46
Higher Education: Race and Gender
Higher Education Participation . . . . . 48
Higher Education Completions by Race and Sex 50
Attainment of Bachelor's and Advanced Degrees, 1977 to 1987 . . . . . 52
Summary: Higher Education Degrees . . . . . 54
Summary . . . . . 56
Appendix . . . . . 59

## Preface

For well over a decade now, America has been taking its pulse in the enterprise of education. The pulse quickened in the late 1970s when parents and educators were alarmed by a decline in the number of "high scorers" on the SAT. Of late, Americans have been concerned that students lack "higher order skills" and have begun to fear that the nation's preeminence is fading in science, mathematics, and engineering. Along with the quality of elementary and secondary education, the quality of higher education has entered the national debate, and sharp critiques charging curricular dilution, such as Allan Bloom's *The Closing of the American Mind*, have increased demand for accountability through the use of standardized assessment instruments.

America continues, however, to have a higher education system that is the envy of many countries of the world, and a higher portion of its youth go through its undergraduate programs than in any other country. While we currently express great dissatisfaction with our elementary and secondary education systems, they still prepare large numbers of students for higher education. Worried on the one hand, and proud on the other, the nation seems to be gearing up for another decade of trying to lift American education beyond what it has settled for in the past.

In this report we will summarize the available information on "performance at the top." We will profile students who performed well on particular measures of academic achievement or attained advanced degrees. It complements the Policy Information Center's prior report, *The Education Reform Decade*, which looked comprehensively at performance for only the elementary and secondary school systems.

Paul Barton
*Director*
*Policy Information Center*


## Acknowledgments

This report was prepared by Paul E. Barton (Director of ETS's Policy Information Center) and Richard J. Coley (Senior Research Associate), with help from a considerable number of people at ETS. The report also benefitted from reviews by several people outside of ETS.

At ETS, advice about program data and interpretation was provided by Gary Marco, Len Ramist, and David Wright of the Admissions Testing Program; Walt MacDonald and Joe Stevens of the Advanced Placement Program; Dawn Robinson, Rob Durso, and Gary Schaeffer of the Graduate Record Examinations Program; and Esti Rosenblum and Fred McHale of the Graduate Management Admission Test. Tom Hilton reviewed the longitudinal data on talent flow in higher education that were drawn from his research. American College Testing Program (ACT) data were provided by James Maxey of ACT, and Dan Koretz of the Rand Corporation reviewed the materials on minority participation in higher education.

The report was also improved by the reviews of Wade Curry of the College Board, Russ Edgerton of the American Association of Higher Education, Margaret Goertz of ETS's Education Policy Research Division, Archie Lapointe and Lynn Jenkins of the National Assessment of Educational Progress at ETS, Larry Ogle of the National Center for Education Statistics, and Don Powers of ETS's Division of Applied Measurement Research.

Carla Cooper provided word processing services, Al Benderson was the editor, Ric Bruce was the designer, and Roseann Spano managed production.

## Introduction

Not since the launching of Sputnik in 1957 has the health of the nation been so closely tied to educational achievement as it is now. A difference is that the interest now is not narrowly focused; rather, it reaches into every nook and cranny of the educational enterprise, has the engagement of every level of government, attends to literacy as well as to the education of scientists and engineers, and extends from children's school readiness to adults' opportunities for life-long learning.

The breadth of this concern was reflected in the National Goals for Education adopted in early 1990 by the President and the nation's governors, goals which ranged from ensuring that children arrive at school well-fed and healthy to providing quality educational programs for adults in the middle of their careers. And for the public elementary and secondary school system, the goals emphasized neither raising average achievement, nor achievement at the bottom or at the top, but rather increasing significantly "the academic performance of elementary and secondary students . . . . in every quartile."

As desirable as it is to have such breadth and depth in the goals for education, it is nevertheless difficult to bring the whole of it into focus at one time and to see clearly where we stand in relation to these goals. The last Policy Information Report, *The Education Reform Decade*, concentrated on progress in the 1980s in elementary and secondary education, looking at achievement at all levels and for minority populations as well as for the nation as a whole.

This report has a single purpose: to present data on educational achievement that indicates how well students at the top of the distribution are performing. Concerns regarding the flow of such talent through our educational system are basically three-fold. First, from the economic standpoint we want to know whether we have enough talent at the top to lead in the competition to design and produce quality products and sell them in international markets. Second, from the standpoint of the principles underlying our educational system, inspired by Thomas Jefferson, we cannot be content with only narrow economic goals, but are concerned with the pursuit of learning for its own sake — as part of the pursuit of happiness. Third, from the standpoint of the commitments this society has made to its people, we want to know whether we have created opportunities for individuals to realize their full potential. Given the complexity of multiple objectives, this report will simplify no more than is necessary for reasonably focused and clear presentation.

However inspired in its purpose, a factual report, such as this one aspires to be, is limited by the existing sources of reliable information. In this scan of performance from the fourth grade through the doctorate degree, we have used data from several sources. From elementary school through graduate school, we mined the data available from testing programs administered by Educational Testing Service (ETS), such as the Scholastic Aptitude Test (SAT), Advanced Placement (AP) Program, Graduate Management Admission Test (GMAT), and Graduate Record Examination (GRE). We also used data collected by the National Assessment of Educational Progress (NAEP), carried out at ETS. For the remainder we have relied particularly on the increasingly comprehensive statistics provided by the National Center for Education Statistics and its principal report, *The Condition of Education*.

Where possible we have provided trend information, and often we have identified high levels of performance separately for minority and majority populations. Increasing high level talent is contingent on raising the educational achievement of minority populations to that of the majority; this will be especially true in the future, as minority groups will become an increasing proportion of the whole.

To focus on this highest band of educational achievement is to address only one aspect of educational performance. It is not intended to convey that this is necessarily where the principal problems lie, or the solutions for that matter. We know we have problems in the area of literacy, and we know we have provided inadequate educational services for high school students who do not directly enter college after graduation. But the concern with the top level is nevertheless legitimate, for preeminence in the world community would be threatened by a failure at the higher reaches of achievement.

Truth in labeling requires that we state at the outset that we have not answered the question of whether our country has sufficient high-level talent. While most would agree that it is unsatisfactory that only one in five nine-year-olds can handle basic mathematical operations and beginning problem solving, it is a less straightforward matter to judge whether the increase in doctorates in business administration is

more or less than needed. We do hope that bringing this information together will enable those who make such judgments to be better informed. We also hope that tracing the development of human resources through various stages in the educational pipeline will provide a more complete picture than specialized analyses at various points now provide.

Lastly, we recognize that a lot of different people and groups mean different things when they discuss educational performance at these high levels. There is discussion of "higher order skills," "critical thinking skills," as well as high levels of proficiency on the scales of NAEP. The term "high scorers" was used in the stories of alarm over declines in SAT scores. In higher education progress is measured by advanced degrees.

In this report we use "high" in the context of the setting and measures that are available, and in a fashion that is often necessarily somewhat arbitrary. In the case of the SAT, for example, we use scores of 600 or higher. In the case of Advanced Placement examination candidates, those that take the examination and get a score of 3 or better (on a scale to 1 to 5) can be considered top achievers among high school students. In the case of NAEP assessments, we have used the proficiency level of 350 (on a scale of from 0 to 500) for 17-year-olds and 12th graders.

The organization of this report is primarily by level of education. It begins with achievements by 9-year-olds in *elementary school*, then 13-year-olds in *junior high school*, and moves to the *high school* level. The next section addresses the transition from *high school to college* and persistence into and through higher education institutions. From *bachelor level education* the report moves to *graduate education*, and then to an examination of *minority and gender* participation in higher education. It closes with a summary of trends in *higher education degrees*.

# 9-Year-Old Reading

At age 9, one in six students can search for specific information, interrelate ideas, and make generalizations (represented by performance at Level 250 on the NAEP scale).* There has been little change between 1971 and 1988 in the percentage of 9-year-olds who can read at this middle level. However, the percentage of males who read at this level has been growing, as can be seen Figure 1.

Although gaps have narrowed between minority and White students, and among regions of the country, they remain considerable (see Figure 2).

About one in 100 of all 9-year-olds read at the "adept" level, a level reached by 11 percent of 13-year-olds and 42 percent of 17-year-olds. Performance at the "adept" level suggests the ability to find, understand, summarize, and explain relatively complicated information.

** NAEP uses a developmental scale, the same one for 9-year-olds as for 13- and 17-year-olds. The middle level of 250 on the scale is relatively high in terms of expectations for 9-year-olds.*

***Level 250 Reading***

*Readers with the ability to use intermediate skills and strategies can search for, locate, and organize the information they find in relatively lengthy passages and can recognize paraphrases of what they have read. They can also make inferences and generalizations about main ideas and authors' purposes from passages dealing with literature, science, and social studies. Performance at this level suggests the ability to search for specific information, interrelate ideas, and make generalizations.*

**In reading, one in six 9-year-olds can search for specific information, interrelate ideas, and make generalizations.**

Figure 1
Percentage of 9-Year-Olds at or above Level 250 on the NAEP Reading Scale

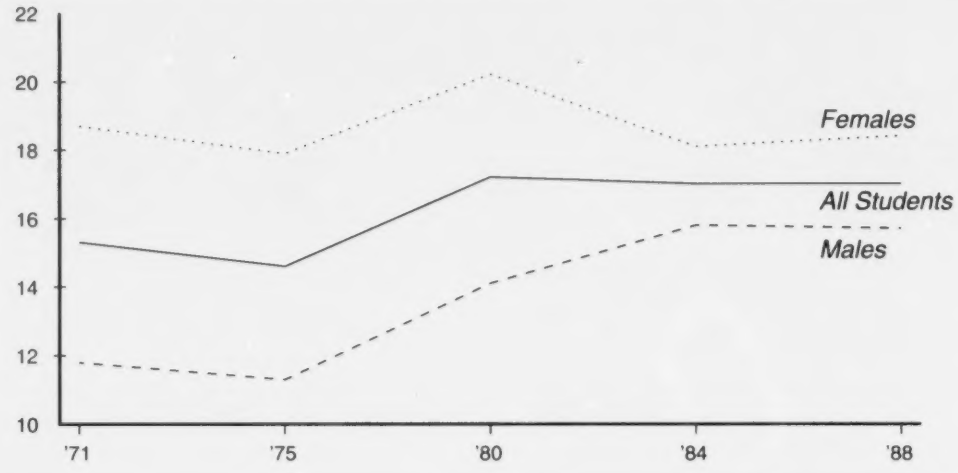
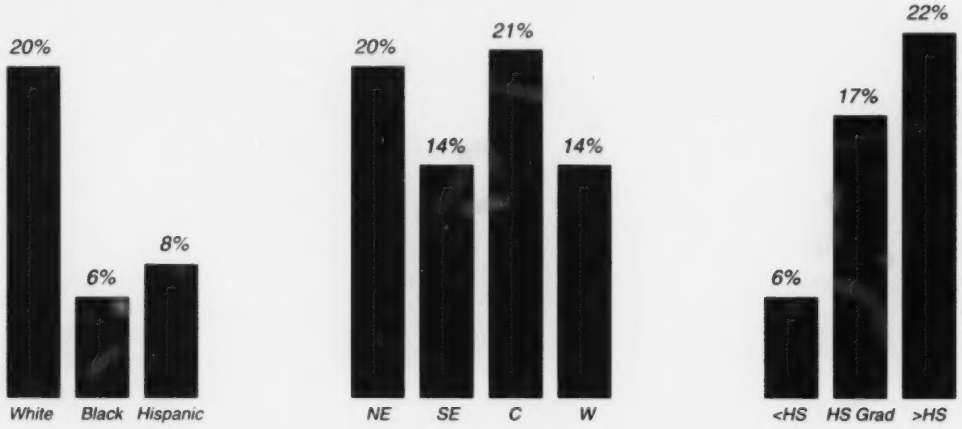



Figure 2
Percentage of 9-Year-Olds at or above Level 250 on the NAEP Reading Scale by Race/Ethnicity, Region, and Parent Education, 1988




*Source: See Appendix Table 1.*

# 9-Year-Old Mathematics

One in five 9-year-olds can perform at the 250 level on the NAEP scale, where they can handle basic mathematical operations and beginning problem solving. There was virtually no change between 1978 and 1986. There is no difference in the percentage of males and females who perform at this level, as can be seen in Figure 3.

The disparities are huge by race/ethnicity — the percentage of Black students at this level is one-fifth the percentage of White students (see Figure 4). Regional disparities have narrowed slightly, but are still considerable. Less than one percent of 9-year-olds reach the 300 level where they can apply moderately complex procedures and reasoning.

***Level 250 Math***

*At level 250 students can handle basic operations and beginning problem solving. They can solve problems such as:*

*There are 10 airplanes on the ground. Six take off and 4 more land. How many are on the ground then?*

**In mathematics, one in five 9-year-olds can perform basic operations and beginning problem solving.**

Figure 3
Percentage of 9-Year-Olds at or above Level 250 on the NAEP Mathematics Scale

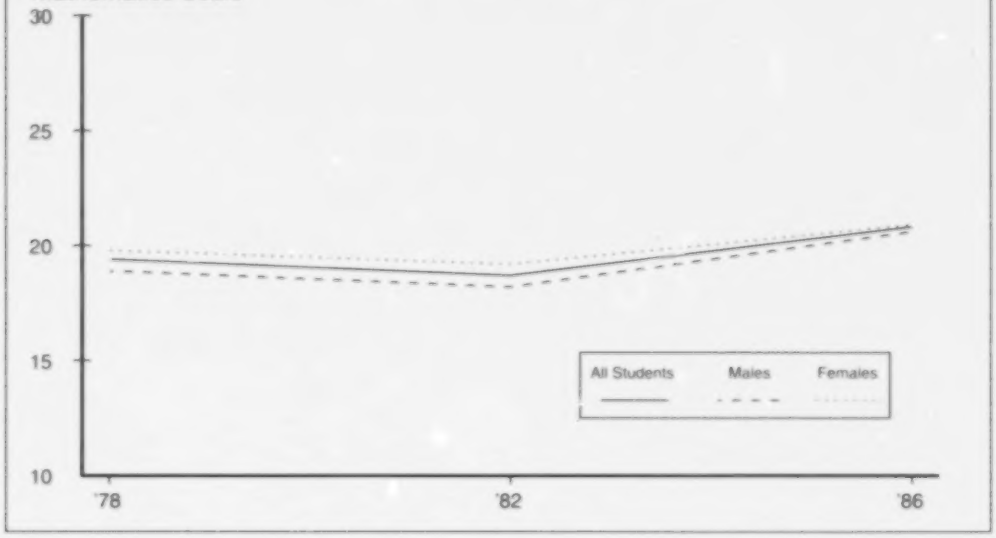
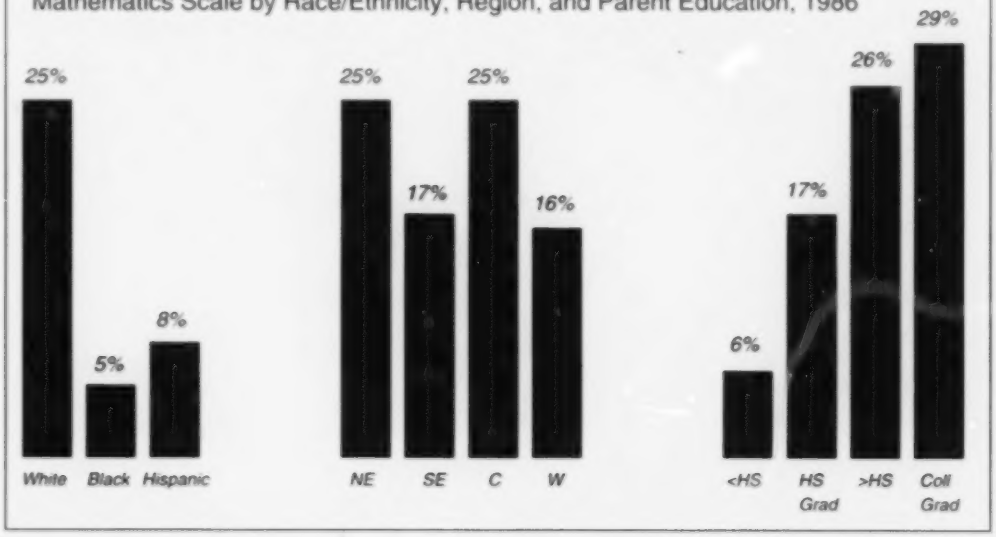



Figure 4
Percentage of 9-Year-Olds at or above Level 250 on the NAEP Mathematics Scale by Race/Ethnicity, Region, and Parent Education, 1986




*Source: See Appendix Table 2.*

# 9-Year-Old Science

In 1986 just over one in four 9-year-olds could apply basic scientific information, and the proportion has remained unchanged since 1977. A slightly higher percentage of males perform at this level (see Figure 5).

Disparities in performance by race/ethnicity have narrowed somewhat across time but remain very large (see Figure 6). The performance of the Southeast improved.

About 3 percent of 9-year olds reach the 300 level where they can use scientific procedures and analyze data, a level reached by 41 percent of 17-year-olds.

***Level 250 Science***

*At level 250 students can interpret data from simple tables and make inferences about the outcomes of experimental procedures. They can solve problems such as:*

*Ten plants were placed in sandy soil, and ten others were placed in clay soil. Both groups of plants were kept at room temperature, given the same amount of water, and placed in a sunny room. This experiment tests the effect of*

- *sunlight on plant growth*
- *temperature on plant growth*
- *different soils on plant growth*
- *water on plant growth*

ERRATUM

Performance at the Top

In Figure 6 on page 9, the percentage of White 9-year-olds at or above Level 250 should be 33 percent. The same change should be made to Appendix Table 8 on page 59.

**In science, just over one in four 9-year-olds can apply basic scientific information.**

Figure 5
Percentage of 9-Year-Olds at or above Level 250 on the NAEP Science Scale

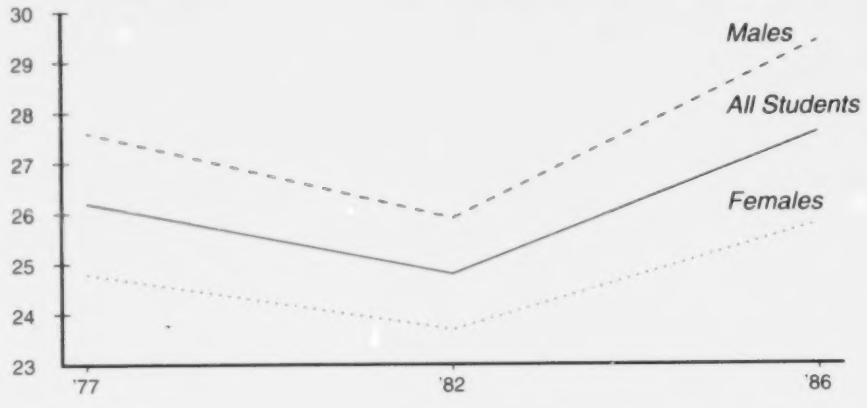
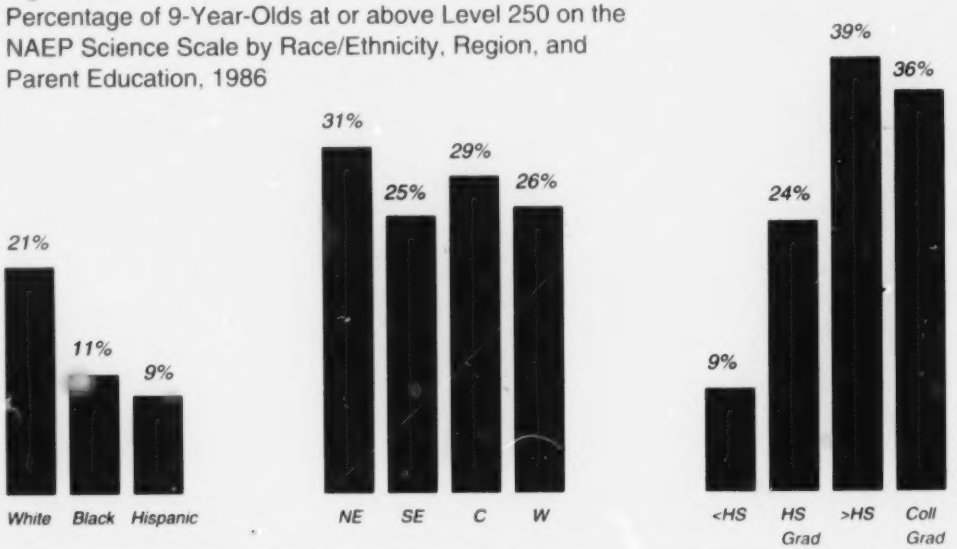



Figure 6
Percentage of 9-Year-Olds at or above Level 250 on the NAEP Science Scale by Race/Ethnicity, Region, and Parent Education, 1986




Source: See Appendix Table 3.

# 13-Year-Old-Reading

At age 13, about one in 10 students can find, understand, summarize, and explain relatively complicated information. The proportion reaching this 300 level on the NAEP scale has been stable from 1971 to 1988 (see Figure 7). Thirteen percent of females reached this level in 1988 compared to 8 percent of males, and the gender gap has remained about the same since 1971.

Figure 8 shows the disparities by race/ethnicity, region, and parental education. While still large, gaps have narrowed between minority and majority students, and among regions (although the percentage reaching the 300 level in the Central region has declined).

***Level 300 Reading***

*Readers at the Adept Level (300) can understand complicated literary and informational passages, including material about topics they study at school. They can also analyze and integrate less familiar material and provide reactions to and explanations of the text as a whole. Performance at this level suggests the ability to find, summarize, and explain relatively complicated information.*

**In reading, about one in ten 13-year-olds can find, understand, summarize, and explain relatively complicated information.**

Figure 7
Percentage of 13-Year-Olds at or above Level 300 on the NAEP Reading Scale

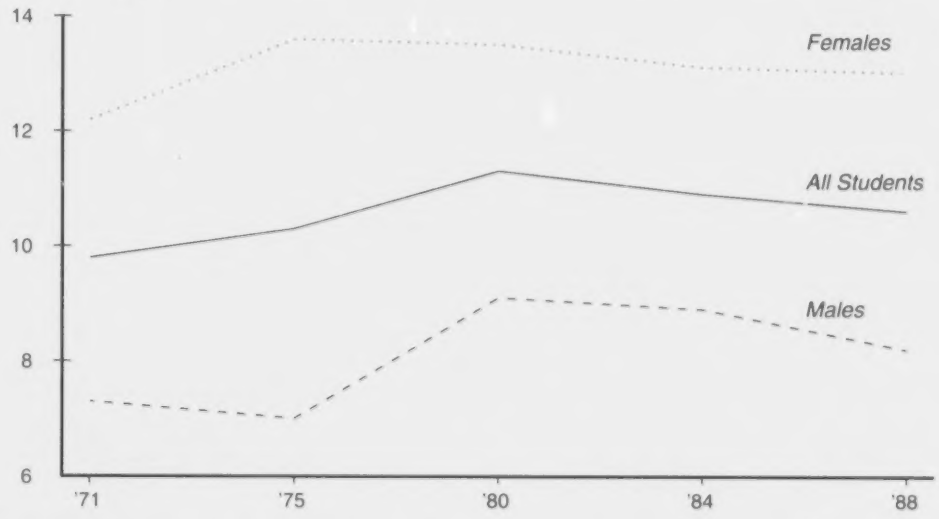
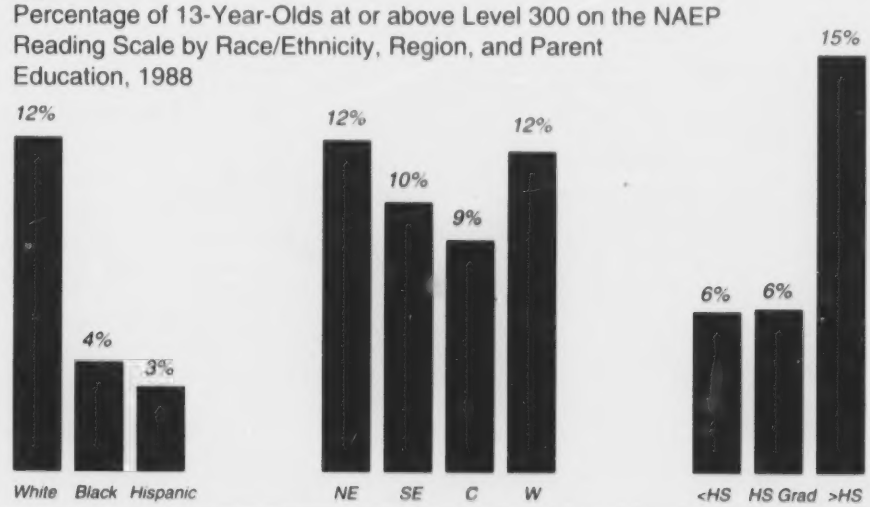



Figure 8
Percentage of 13-Year-Olds at or above Level 300 on the NAEP Reading Scale by Race/Ethnicity, Region, and Parent Education, 1988




Source: See Appendix Table 4.

# Eighth-Grade History and Civics

## U.S. History

Among eighth-grade students, almost 13 percent understand basic terms and historical relationships (see Figure 9). Among male students, 16 percent reach this level, compared to 10 percent of females. Figure 9 also shows disparities in proficiency by race/ethnicity and region.

***Level 300 U.S. History***

*At Level 300 students understand basic historical terms and relationships. They can answer questions such as the following:*

*In the 1840s the idea that the United States eventually should control the continent from ocean to ocean was known as:*

*A. popular sovereignty*

*B. the Wilmot Proviso*

*C. accession*

*D. Manifest Destiny*

## Civics

Almost 13 percent of eighth-grade students understand specific government structures and relationships (see Figure 10). Among male students, 14 percent reach this level, compared with 11 percent for females. Figure 10 also shows disparities in proficiency by race/ethnicity and region.

***Level 300 Civics***

*At Level 300 students understand specific government structures and relationships. They can correctly answer questions such as:*

*What is the major criticism of the electoral college system in the United States?*

*A. Its procedures delay the selection of the winner in presidential elections.*

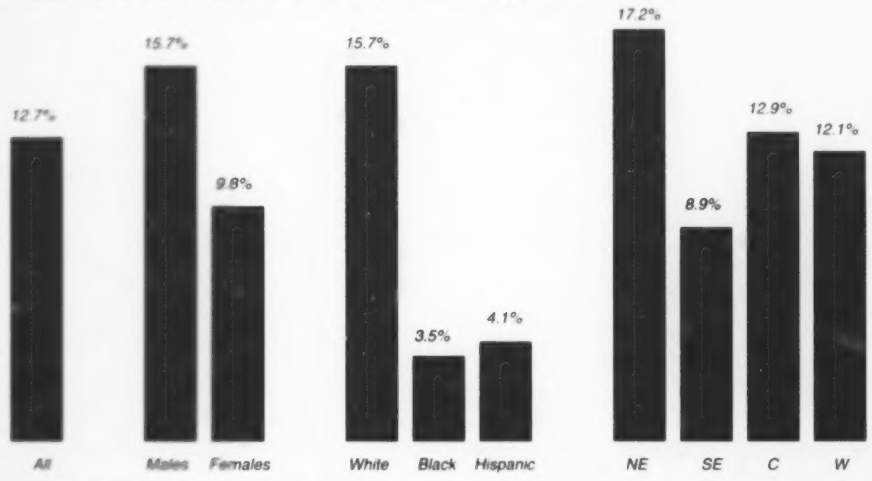
*B. Its existence encourages the growth of third parties.*

*C. It permits a candidate who did not win a majority of popular votes to be declared the President.*

*D. It undermines the power of the national party conventions.*

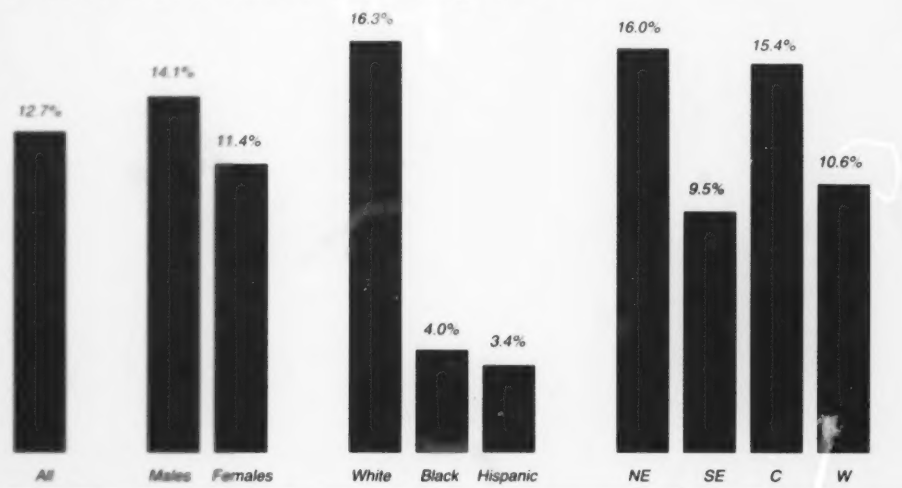
## In U.S. history, one in eight eighth graders can understand basic terms and historical relationships.

Figure 9
Percentage of Eighth Grade Students at or above Level 300 on the NAEP History Scale by Sex, Race/Ethnicity, and Region, 1988




## In civics, one in eight eighth graders can understand specific government structures and relationships.

Figure 10
Percentage of Eighth Grade Students at or above Level 300 on the NAEP Civics Scale by Sex, Race/Ethnicity, and Region, 1988




*Source: See Appendix Table 5.*

# 13-Year-Old Mathematics and Science

## Mathematics

According to the International Assessment of Educational Progress (IAEP), just one in 11 13-year-olds in the U.S. reached the level in mathematics where they understand measurement and geometry concepts and can solve more complex problems. This is about one-fourth of the proportion that reach this level in Korea (see Figure 11). While still relatively low, average mathematics achievement among 13-year-olds in the U.S. has been rising in the 1980s, according to the National Assessment of Educational Progress. Achievement has not increased, however, at the higher levels on the proficiency scale.

### *Level 600 Mathematics*

*At Level 600 on the mathematics scale of the International Assessment of Educational Progress, students understand measurement and geometry concepts and solve more complex problems. They can solve problems such as the following:*

*The length of a side of this square is 6. What is the radius of the circle?*

*A.* 2 *B.* 3 *C.* 4 *D.* 6
*E.* 8 *F.* 9 *G.* Don't Know

## Science

The international results for science achievement parallel those for mathematics, although the achievement range is not as large (see Figure 12). The U.S. proportion at or above the 600 level is one-third that of Korea. As in mathematics, average science achievement has risen in the U.S. between 1978 and 1988, although not at the higher levels on the scale.

### *Level 600 Science*

*At Level 600 on the science scale of the International Assessment of Educational Progress, students understand and apply intermediate scientific knowledge and principles. They can solve problems such as the following:*

| | |
|---|---|
| ***Group A*** | *Water Vapor* |
| | *Oxygen* |
| | *Air* |
| ***Group B*** | *Ice* |
| | *Aluminum* |
| | *Iron* |
| ***Group C*** | *Alcohol* |
| | *Water* |
| | *Gasoline* |

*The substances above, each at room temperature, have been classified into groups. On what property is the classification based?*

*A. Chemical composition*
*B. Specific heat*
*C. State of matter*
*D. Abundance within the earth's crust*

**Among 13-year-old students in the developed world, relatively few Americans understand measurement and geometry concepts or scientific knowledge and principles.**

Figure 11
Percentage of 13-Year-Old Students at or above Level 600 on the IAEP Mathematics Scale, 1988

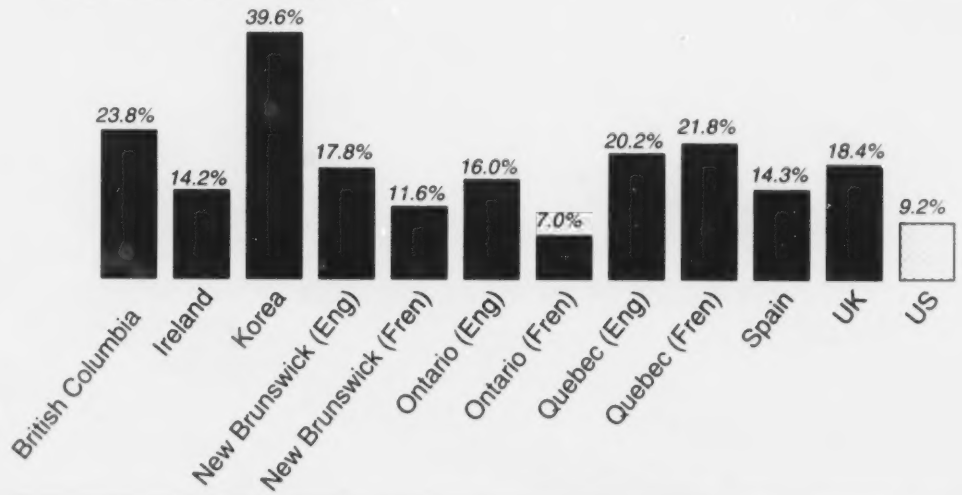
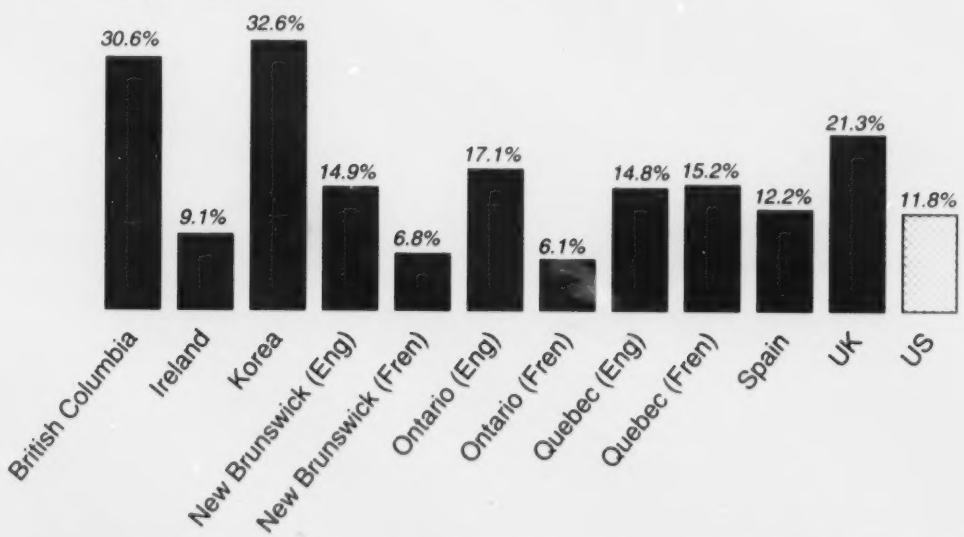



Figure 12
Percentage of 13-Year-Old Students at or above Level 600 on the IAEP Science Scale, 1988




*Source: See Appendix Table 6.*

# 17-Year-Old Reading, Mathematics, and Science

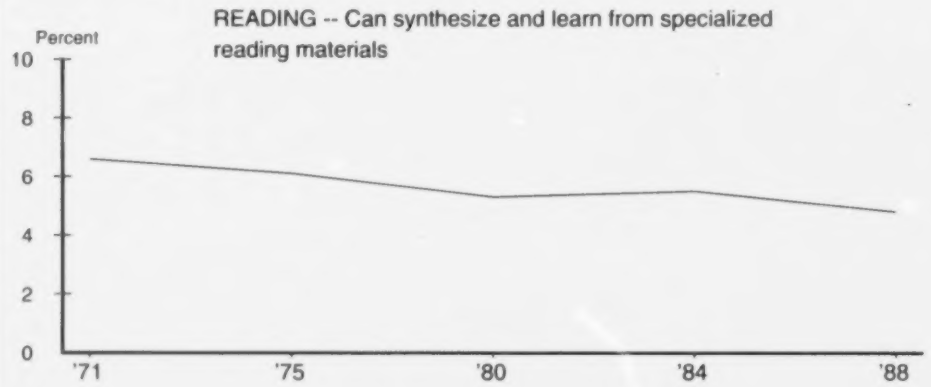
Few students at age 17 reach the 350 level in any academic subject covered by the proficiency scales of the National Assessment of Educational Progress (see Figure 13). About one in 20 did so in reading in 1988, down from 1971. One in 15 did so in mathematics in 1988, little changed from 1978. And one in 12 did so in science, the same as in 1978. (This does not mean that more students do well in science than in other subjects; performance across subject area proficiency scales cannot be compared.)

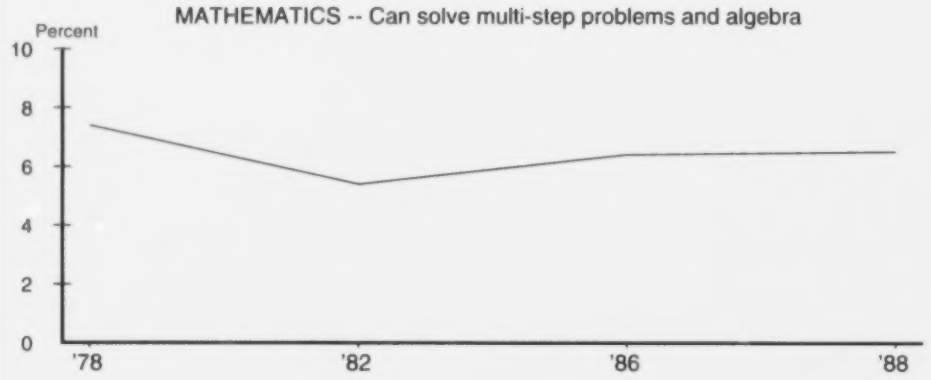
***Level 350 NAEP***

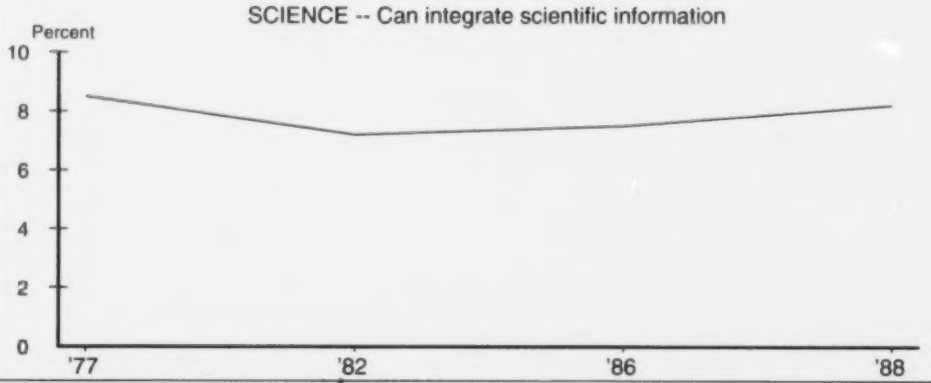
*The proficiency scales used by the National Assessment of Educational Progress describe the abilities of students at various levels of academic performance. However, these levels are not comparable across different subject areas.*

**There has been a slight decline in higher-level reading skills among 17-year-olds and stability at higher levels of mathematics and science, but few students reach these levels.**

Figure 13
Trends in the Percentage of 17-Year-Olds at Level 350 on NAEP




*Source: See Appendix Table 7.*

**Few 12th-grade students reach a broad understanding of American institutions of government and are able to interpret U.S. historical information and ideas.**

**HIGH SCHOOL**

## 12th-Grade Civics

Six percent of 12th-grade students have broad and multifaceted understanding of the institutions of government and the processes by which they operate. They are able to transfer and apply their civics learning to a variety of problem contexts. They are at or above the 350 level on the NAEP civics proficiency scale.

***Level 350 Civics***

*Students at level 350 know such things as:*

- *Who in the Federal government has the power to tax*
- *Who may vote in a closed primary election*
- *What bicameralism is*
- *What judicial review is*

## 12th-Grade U.S. History

Less than five percent of 12th-grade students can interpret historical information and ideas. They are developing a detailed understanding of historical vocabulary, facts, regions, and ideas, and becoming familiar with a wide variety of historical texts. They are at or above the 350 level on the NAEP history proficiency scale.

*Sources:* The Civics Report Card *and* The U.S. History Report Card, *National Assessment of Educational Progress, Educational Testing Service, 1990.*

***Level 350 U.S. History***

*Students at level 350 know such things as:*

- *Why Jane Addams founded Hull House*
- *How the Federal government encouraged the building of major continental railroads*
- *What Gloria Steinem, Betty Friedan, and Kate Millett have in common*
- *Why people of different religious backgrounds settled in the colony of Pennsylvania*

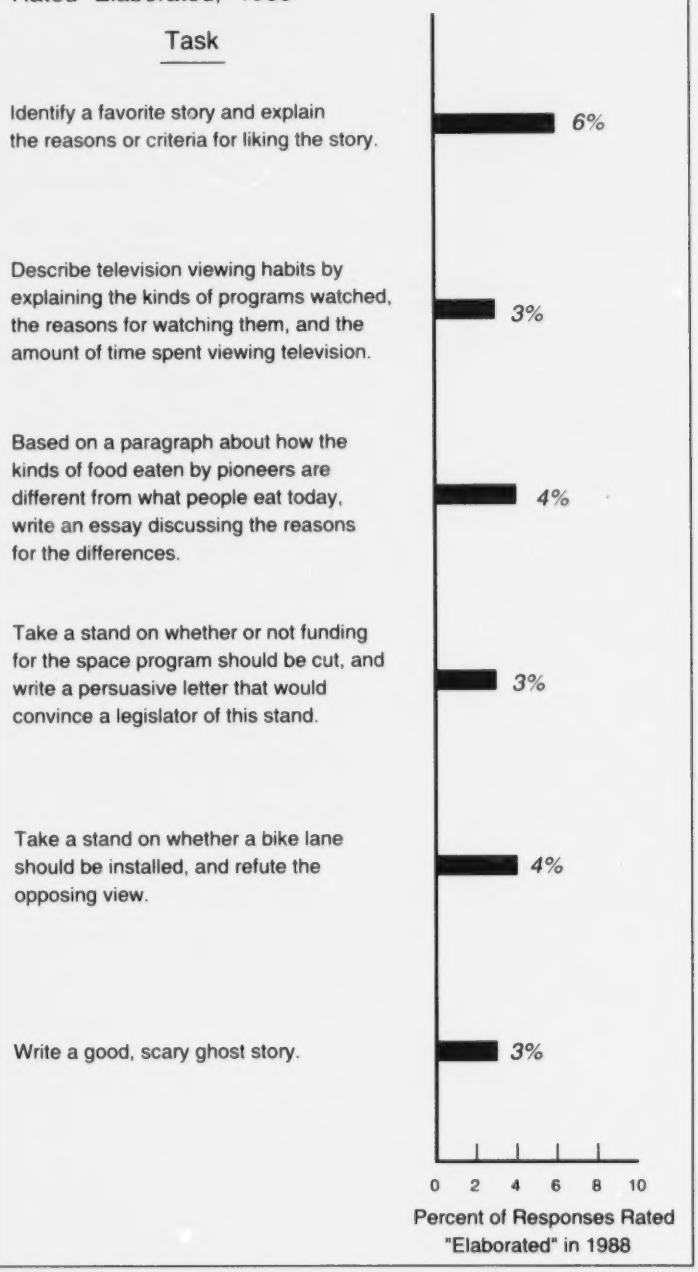
**Few 12th-grade students achieve a high level of writing ability, going simply beyond "adequate" or "minimal."**

# 12th-Grade Writing

American education produces few students who can write well. On the first task in Figure 14, 45 percent of 12th-grade students provided a "minimal" response. Twenty-nine percent of responses were judged "adequate"; they "included the information and ideas necessary to accomplish the underlying task...." Just 6 percent of the responses were rated as "elaborated"; they "went beyond the essential, reflecting a higher level of coherence and provided more detail to support the points made."

*Source:* Learning to Write in Our Nation's Schools, *National Assessment of Educational Progress, Educational Testing Service, 1990.*

Figure 14
Percentage of 12th-Grade Writing Rated "Elaborated," 1988


Task
Identify a favorite story and explain the reasons or criteria for liking the story.
6%
Describe television viewing habits by explaining the kinds of programs watched, the reasons for watching them, and the amount of time spent viewing television.
3%
Based on a paragraph about how the kinds of food eaten by pioneers are different from what people eat today, write an essay discussing the reasons for the differences.
4%
Take a stand on whether or not funding for the space program should be cut, and write a persuasive letter that would convince a legislator of this stand.
3%
Take a stand on whether a bike lane should be installed, and refute the opposing view.
4%
Write a good, scary ghost story.
3%
0 2 4 6 8 10
Percent of Responses Rated "Elaborated" in 1988

# Advanced Placement Participation

The Advanced Placement Program (AP) is associated with academic rigor in high school. In 1990, 323,736 U.S. students took 480,696 AP examinations, continuing an upward trend that can be seen in Figure 15. In fact, the number of students participating has grown by over 500 percent during the last two decades. In addition to this tremendous growth, students taking AP examinations continue to experience high levels of success. In 1990, two-thirds of all AP grades were "3" or higher (a score that most colleges recognize as worthy of college credit). The fact that AP grades have been stable for many years in spite of this growth suggests that the program's limits have not been reached and that greater numbers of students could successfully attempt college-level work in high school.

The proportion of minority students participating in AP has also grown steadily during the last decade or so (see Figure 16). Asian-American students comprise almost half of all minority student test-takers. In 1990, about one-fifth of all AP candidates were members of minority groups, more than double the percentage during 1978.

*The Advanced Placement Program (AP) is a cooperative educational endeavor sponsored by the College Board. The program serves three groups: high school students who wish to pursue college-level studies, high schools that wish to offer these opportunities, and colleges that wish to encourage and recognize high-level achievement. The program provides guides and descriptions of college-level courses to high schools and issues the results of examinations based on these descriptions to the colleges of the students' choice. Participating colleges, in turn, grant credit and/or appropriate placement to students who have done well on the examinations.*

**Advanced Placement (AP) scores have been remarkably stable during a time of tremendous program growth. Minority participation in the program has grown steadily.**

Figure 15
Growth in the Number of AP Candidates and Average AP Grade

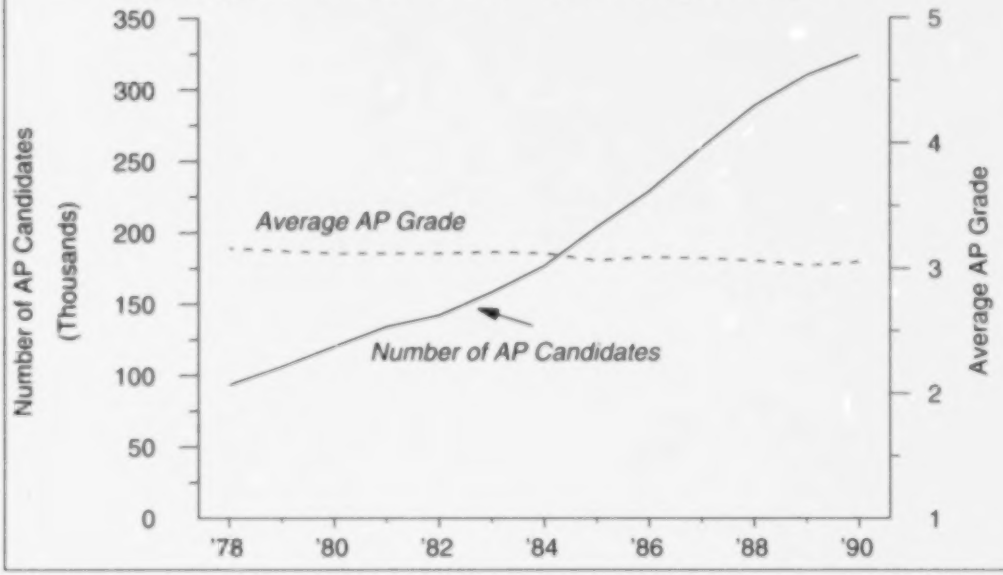
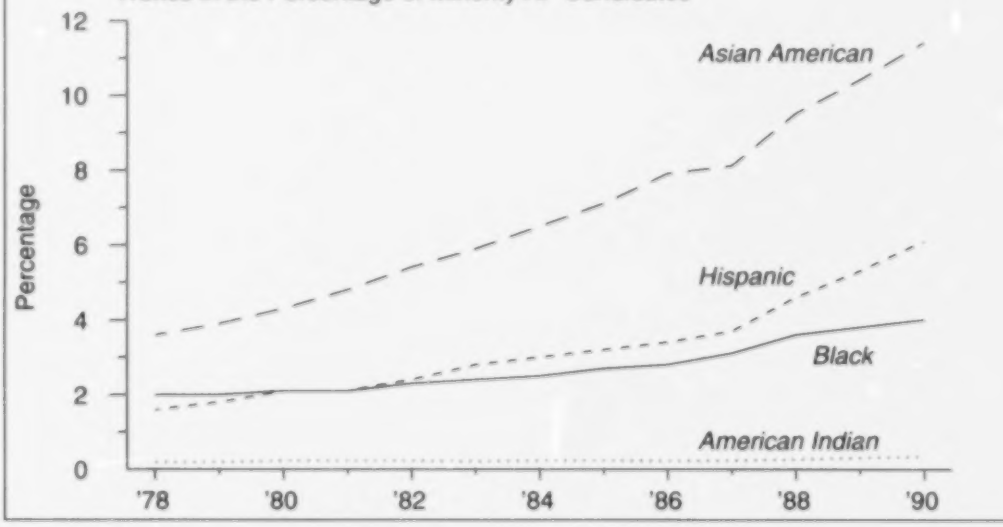



Figure 16
Trends in the Percentage of Minority AP Candidates




*Source: See Appendix Table 8.*

# College Admissions Tests

In the late 1970s there was concern about the steady decline in the percentage of SAT takers who were high scorers. In 1981, a low point in math was reached when only 14 percent of test takers scored 600 or above, and in 1983 a low was reached on the verbal test when only 7 percent of test takers achieved scores at 600 or above. Since then, the percentage of math high scorers has risen steadily, to 18 percent in 1990; for the verbal test, the percent rose to 8 in 1987 and has fluctuated since then (see Figure 17).

On the ACT, the percentage of test takers scoring 27 or above in math has dropped, the percentage of high scorers on the English test has risen slightly, and the percentage scoring high on the composite of all four ACT tests has been basically level (see Figure 18). We do not know why these somewhat divergent trends among the various SAT and ACT tests have occurred.

The SAT and the ACT tests measure somewhat different skills, knowledge, and abilities, and the trends for the two tests vary because the characteristics of the test takers change. Neither are representative of all high school seniors, and they cannot be relied upon as measures of performance in school. The most reliable picture of the percentage of high scorers over time comes from the National Assessment of Educational Progress data that are presented elsewhere in this report.

*SAT scores were provided by the College Board and ETS; ACT scores were provided by the American College Testing Program. The levels of 600 on the SAT and 27 on the ACT are not comparable in terms of either the percentiles these scores represent or the level of proficiency on different tests.*

*After 1985, the ACT data are for seniors only; before that they are for all test takers. The SAT data are for seniors only.*

## Trends in the percentage of high scorers on the SAT and ACT college admissions tests do not follow a clear or consistent pattern.

Figure 17
Percentage of Students Scoring 600 or above on the SAT, 1972-1990

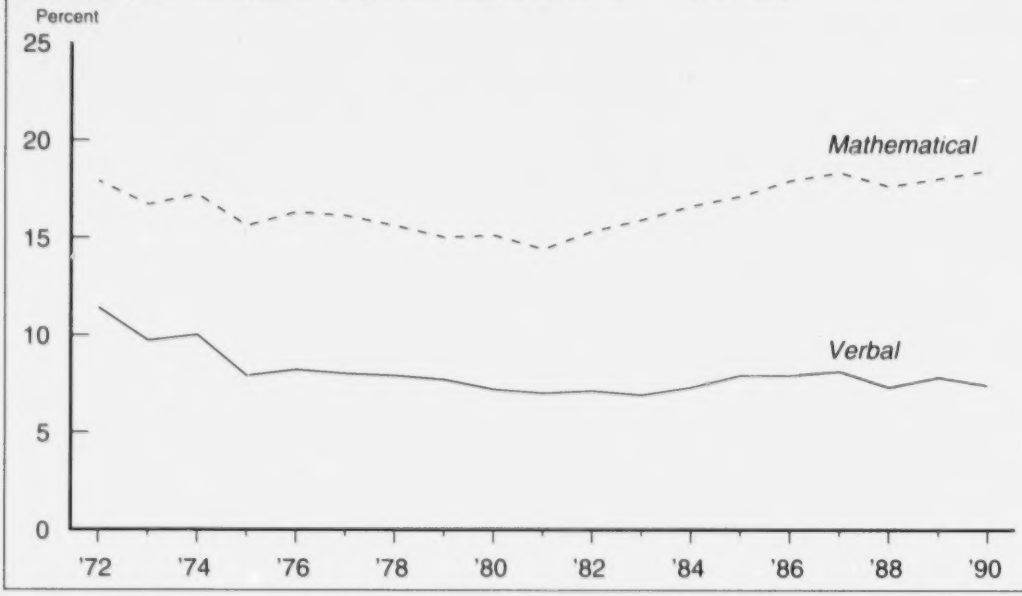
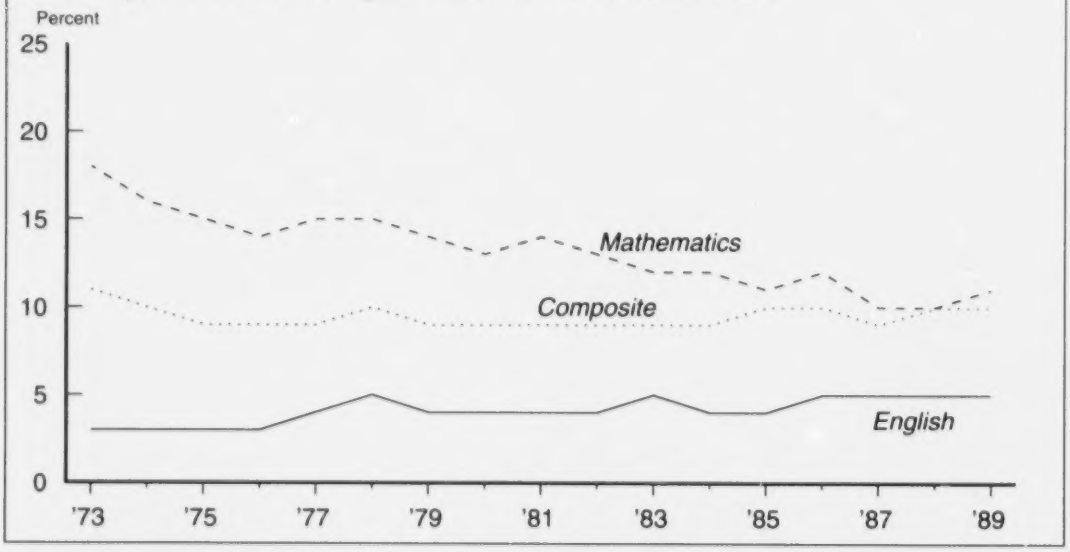



Figure 18
Percentage of Students Scoring 27 or above on the ACT, 1973-1989




*Source: See Appendix Tables 9 and 10.*

# Achievement Tests of the Admissions Testing Program

The number of students who elected to take the Achievement Tests declined during the late 1970s and early 1980s and then rose steadily until 1988 when another decline began. As a proportion of high school graduates, however, Achievement Test takers increased steadily, from 6.5 percent in 1979 to 8.0 percent in 1988, dropping back to 7.6 percent in 1989 and 1990 (see Figure 19).

Achievement Test takers' average SAT verbal score of 515 and mathematical score of 585 is nearly 100 points higher, respectively, than the average for all students. For this group of students, average SAT verbal and math scores and the average score across all of the Achievement Tests generally has been rising since 1977 (see Figure 20).

There are 14 Achievement Tests; reported here are the six with the highest volume. The number of students taking the advanced math test has nearly doubled since 1977. American History test taker volume declined by a little more than one-fifth and English Composition by 8.5 percent; Biology, Chemistry, and Math I showed small declines. Mean scores held steady in Math I, Math II, and Chemistry. Increases occurred in American History (38 points), Biology (18 points), and English Composition (7 points) (see Appendix Tables 12 and 13).

*The SAT and Achievement Tests are complementary testing programs offered by the Admissions Testing Program of the College Board. The Achievement Tests are designed to measure knowledge in specific subject areas and the ability to apply that knowledge. Students who take the Achievement Tests tend to apply to selective colleges and universities and to score substantially higher on the SAT than other students.*

**About 8 percent of our high school seniors take the Achievement Tests. Their average SAT scores are much higher than other students' scores and have been generally increasing.**

Figure 19
Achievement Test Trends

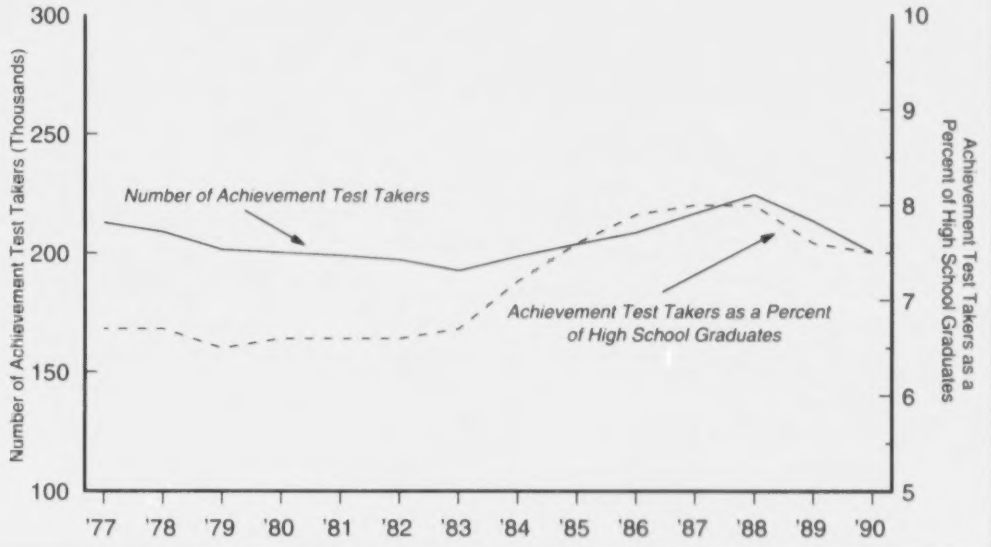
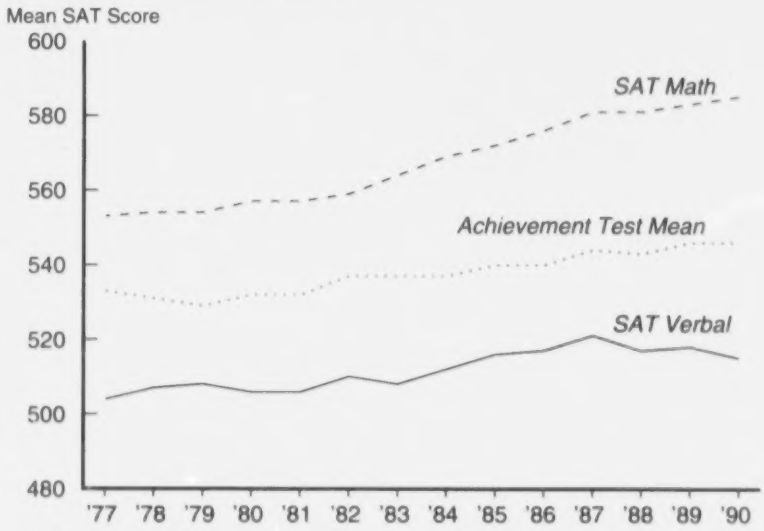



Figure 20
SAT Score Trends for Achievement Test Takers




*Note: Achievement Test scores before 1980 may not be comparable with those after that because of new scaling procedures.*

*Source: See Appendix Table 11.*

# Educational Pathways of High School Seniors, 1972 and 1980

1980 high school seniors went on to receive bachelor's degrees and entered graduate and professional schools at about the same rate as 1972 high school seniors (see Figure 21). However, there was a decline in the percentage of Black seniors receiving a bachelor's degree, in the percentage of both Black and Hispanic seniors entering graduate school, and in the percentage of Hispanic seniors entering professional schools.

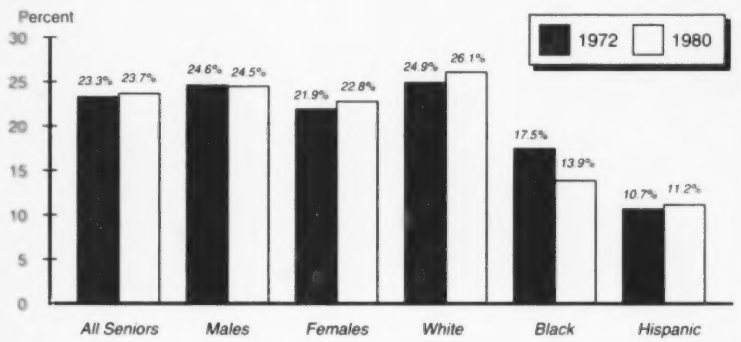
Minority seniors receive baccalaureate degrees at half the rate of White seniors and enter graduate and professional schools at from one-fourth to one-third of the White rate.

*See pages 28 and 30 for descriptions of the source of the estimates for Figures 21, 22, and 23. Small differences should not be considered statistically significant.*

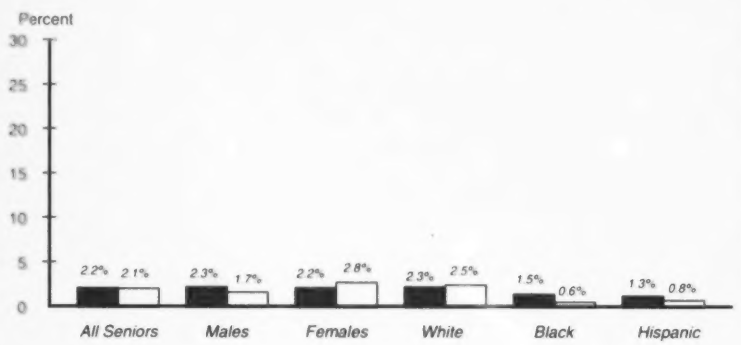
**The percentage of 1980 high school seniors continuing their education was similar to that of 1972 seniors, except for a decline in minority students pursuing higher education.**

Figure 21
Academic Progress of High School Seniors, 1972 and 1980

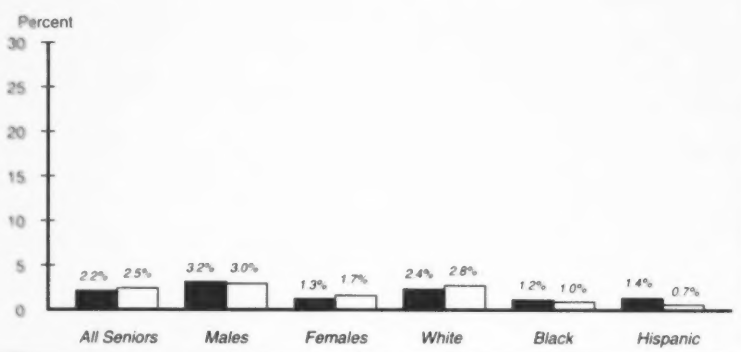
**Earned Bachelor's Degree**




**Entered Graduate School**




**Entered Professional School**




*Source: "Talent Flow in Higher Education: A Longitudinal Study of 1980 High School Graduates and the Sub-group Taking the Graduate Record Examination," Thomas Hilton and Judith Pollack, GRE 86-16 (in press, Grad. Record Exam. Board)*

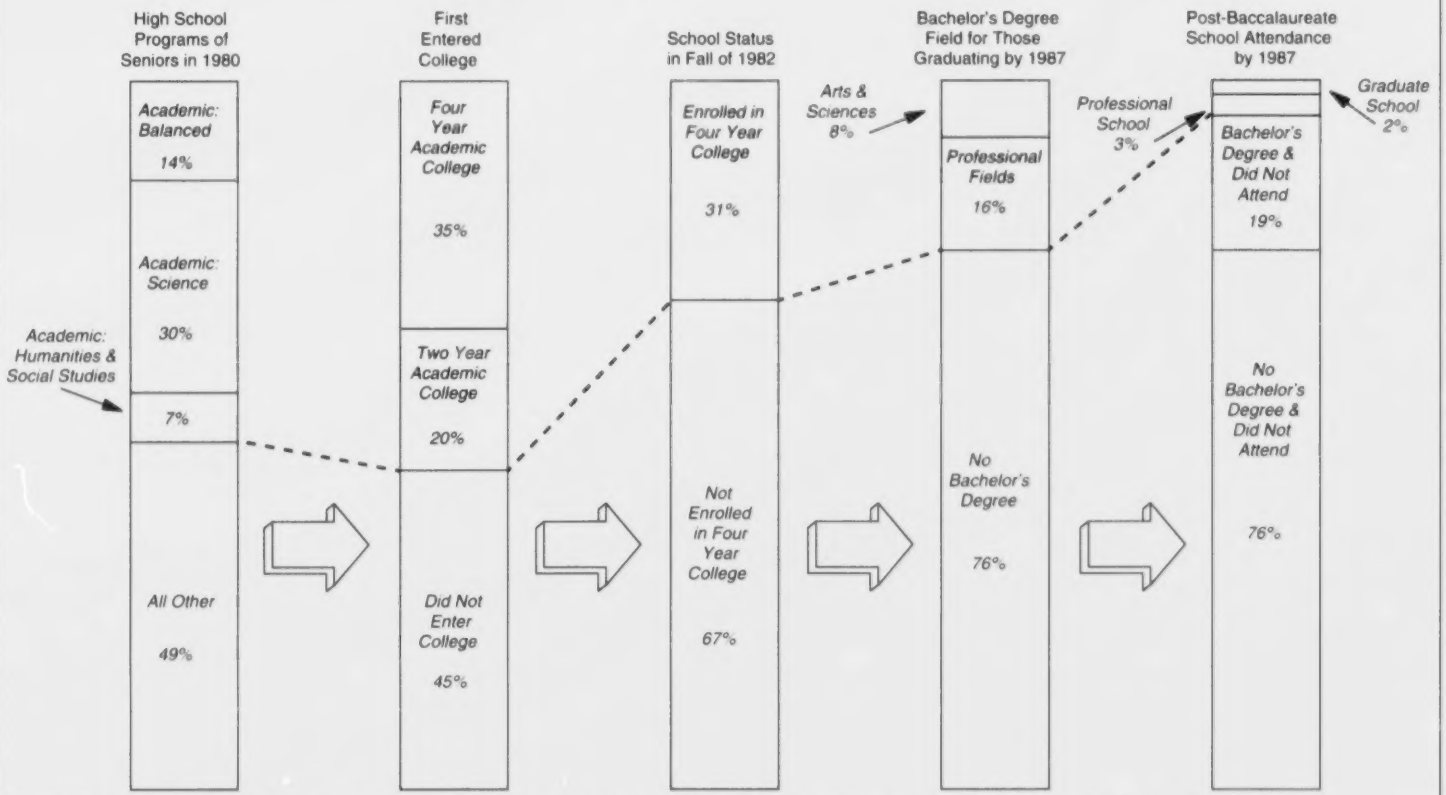
# Educational Pathways of High School Seniors, 1980 and 1987

Half of 1980 high school seniors were in academic programs, and more than half entered college (35 percent in four-year colleges and 20 percent in two-year colleges) (see Figure 22). Two years after graduation, 31 percent were enrolled in four-year colleges; by 1987, 8 percent had received a bachelor's degree in arts and sciences, and 16 percent in professional fields. Only 2 percent entered graduate school, and 3 percent entered professional school. This flow through the educational system is very similar to that for 1972 high school seniors, with some exceptions (see Figure 21). Comparable longitudinal information will not be available again until the seniors of 1992 are tracked on a comparable basis in the National Educational Longitudinal Survey (NELS-88), which began with 8th-grade students in 1988.

*The estimates for Figure 22 are from the work of Thomas L. Hilton and Judith Pollack of Educational Testing Service for the Graduate Record Examination Board. They were derived from the longitudinal studies carried out by the Department of Education, the 1972 National Longitudinal Study and the 1980 High School and Beyond Study. Since the follow-up surveys for these studies were not made at equal intervals, some assumptions had to be made by the authors to adjust for the differences.*

**One in four 1980 high school graduates are estimated to have received a bachelor's degree by 1987, and one in 20 entered graduate level studies.**

Figure 22
Educational Pathways of 1980 High School Seniors




*Source: "Talent Flow in Higher Education: A Longitudinal Study of 1980 High School Graduates and the Sub-group Taking the Graduate Record Examination," Thomas Hilton and Judith Pollack, GRE 86-16 (in press, Graduate Record Examination Board).*

# Educational Pathways of High Ability Seniors

Half of high ability seniors in 1980 are estimated to have received a bachelor's degree by 1987, and just one in eight entered graduate school or post-baccalaureate professional school by that date (see Figure 23).

One in 10 high ability seniors did not enter college upon graduation, and almost two in five entered two-year academic colleges, some of whom later transferred to four-year institutions.

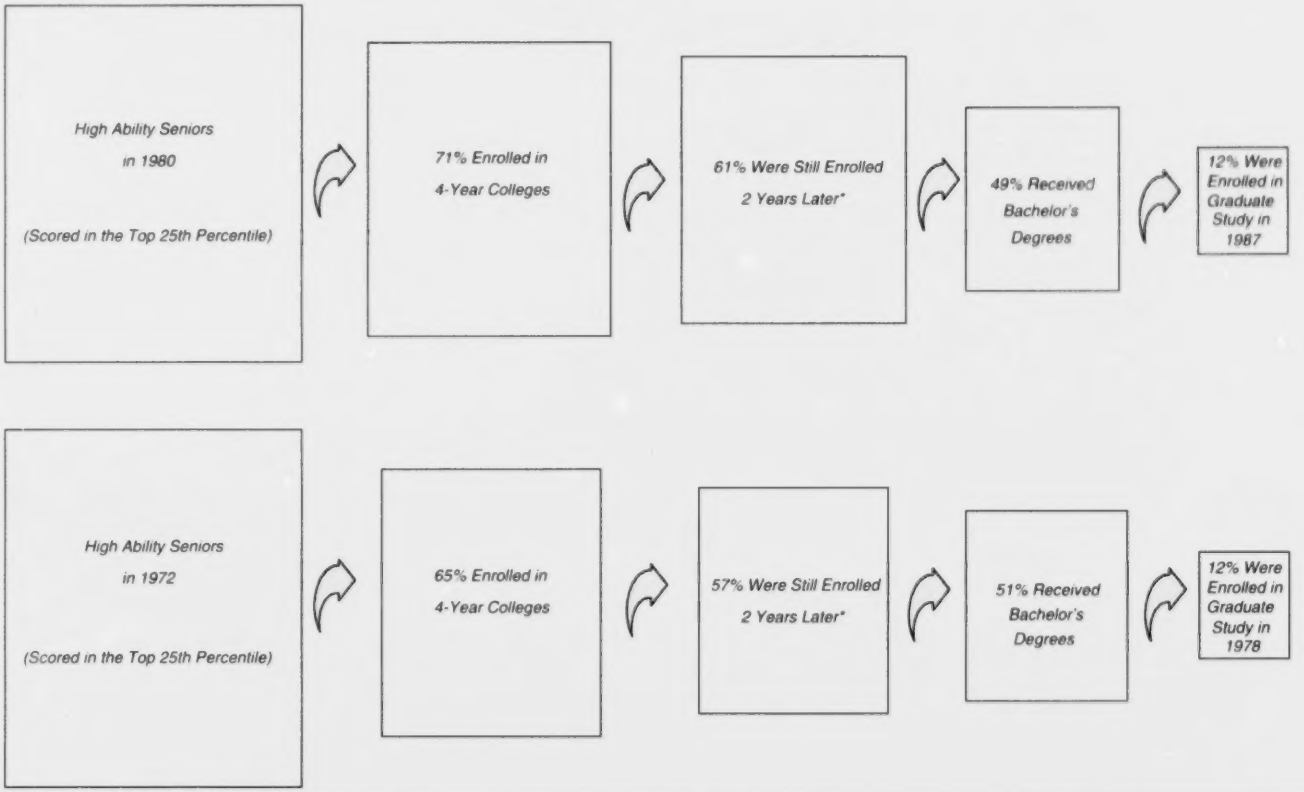
Somewhat fewer 1972 high ability seniors enrolled in four-year colleges than did 1980 seniors. However, about the same percentage completed their undergraduate educations.

There are large losses of this talent at the higher levels of postsecondary education.

*High ability seniors are those who scored in the top 25 percent on the tests given by the National Longitudinal Study in 1972 and the High School and Beyond study in 1980. The follow-up surveys were analyzed by Thomas L. Hilton and Judith Pollack at Educational Testing Service. Since the follow-up surveys of the Department of Education (which carries out these studies) were not made at equal intervals, some assumptions were made by the authors to adjust for the differences.*

## About half of high ability seniors receive bachelor's degrees, and one in eight enroll in graduate level programs.

Figure 23
Educational Pathways of High Ability Seniors, 1980 and 1972


High Ability Seniors in 1980
(Scored in the Top 25th Percentile)
71% Enrolled in 4-Year Colleges
61% Were Still Enrolled 2 Years Later*
49% Received Bachelor's Degrees
12% Were Enrolled in Graduate Study in 1987
High Ability Seniors in 1972
(Scored in the Top 25th Percentile)
65% Enrolled in 4-Year Colleges
57% Were Still Enrolled 2 Years Later*
51% Received Bachelor's Degrees
12% Were Enrolled in Graduate Study in 1978

*Some of these students were first enrolled in community colleges; almost one in five of these high ability seniors enrolled in two-year academic colleges after graduating from high school.

Source: "Talent Flow in Higher Education: A Longitudinal Study of 1980 High School Graduates and the Sub-group Taking the Graduate Record Examination," Thomas Hilton and Judith Pollack, GRE 86-16 (in press, Graduate Record Examination Board). Derived from chart on p. 17.

# Graduate Record Examination General Test

Scores on the General Test of the Graduate Record Examination (GRE) rose in the 1980s. On a scale of 200 to 800, mean scores on the Quantitative measure rose 36 points from 1981 to 1990. Scores on the Analytical measure rose 30 points. On the Verbal measure, there was only a small gain of 8 points (see Figure 24).

These scores rose at a time when the number of test takers also rose. In 1990, 157,023 took the examination, an increase of 16 percent over 1981. The rise was particularly sharp between 1988 and 1990.

By this measure, the scholastic ability of applicants to graduate school has been increasing, substantially in quantitative and analytical ability, and slightly in verbal ability.

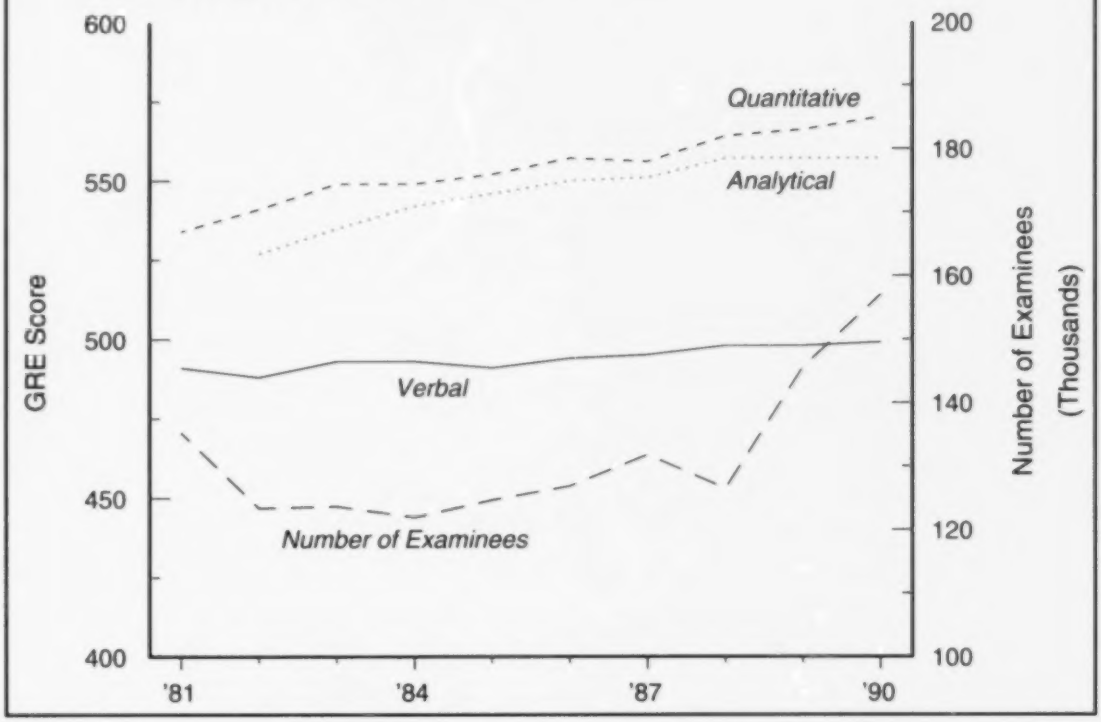
*The General Test of the Graduate Record Examination yields separate scores for the verbal, quantitative, and analytical abilities related to success at the graduate level of education.*

- *The verbal measure employs four types of questions: antonyms, analogies, sentence completions, and reading comprehension.*
- *The quantitative measure employs three types of questions: discrete quantitative questions, data interpretation questions, and quantitative comparison questions.*
- *The analytical measure is of analytical reasoning and logical reasoning.*

*Most examinees apply to graduate school, but not all enroll. Not all graduate departments in the United States require the GRE General Test. Even though the number of departments that use the test is large and appears to be increasing, GRE General Test examinees are not necessarily representative of all applicants to or enrollees in a field or in graduate education generally.*

**Verbal, quantitative, and analytical scores rose between 1981 and 1990 on the General Test of the Graduate Record Examination; at the same time the volume of examinees rose 16 percent.**

Figure 24
GRE Score Trends, 1981- 1990




| | 1981 | 1990 | |
|---|---|---|---|
| *Volume* | *135,339* | *157,023* | *Up 16 Percent* |
| *Verbal Mean* | *491* | *499* | *Up 8 Points* |
| *Quantitative Mean* | *534* | *570* | *Up 36 Points* |
| *Analytical Mean* | *527** | *557* | *Up 30 Points* |

**Mean for 1982*

*Source: See Appendix Table 15.*
*Note: Data are for college seniors and non-enrolled college graduates.*

# Graduate Record Examination Subject Tests

Large increases in GRE Subject Test volumes between 1981 and 1990 occurred in computer science, literature, physics, mathematics, sociology, history, and psychology. Score increases occurred in computer science, math, and psychology; decreases occurred in the other subjects (see Figure 25).

Decreases in the volume of test-takers occurred in geology, music, education, economics, biology, political science, chemistry, and engineering. There were score increases in education, economics, chemistry, and engineering.

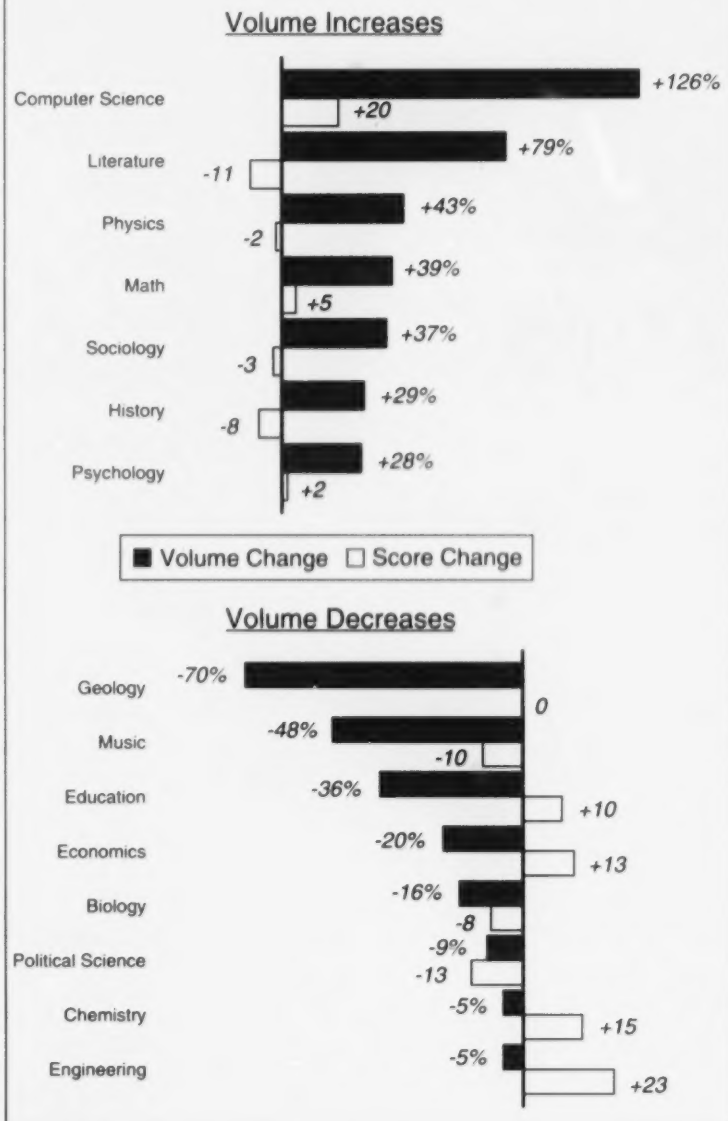
Figure 25 also shows GRE Subject Test volumes for the 1989-90 testing year.

*Scores on the GRE Subject Tests are intended to indicate students' knowledge of the subject matter emphasized in many undergraduate programs as preparation for graduate study. For some Subject Tests, subscores are provided in addition to the total score; these subscores indicate the strengths and weaknesses of individual students' preparation.*

*Total testing time for each Subject Test is 2 hours and 50 minutes.*

**Mean scores rose from 1981 to 1990 in seven GRE Subject Tests; they were stable in one Subject Test, and fell in seven Subject Tests. Seven Subject Tests had increases in examinees, and eight had declines.**

Figure 25
Changes in the Number of Examinees and Mean Scores, GRE Subject Tests, 1981-1990




1990 Test-Takers

Computer Science - 2,999
Literature - 4,880
Physics - 2,799
Math - 2,181
Sociology - 1,089
History - 1,809
Psychology - 11,175

Geology - 642
Music - 796
Education - 860
Economics - 1,337
Biology - 7,701
Political Science - 1,316
Chemistry - 2,961
Engineering - 3,626

*Source: See Appendix Tables 16 and 17.*
*Note: Data are for college seniors and non-enrolled college graduates.*

# Graduate Management Admission Test (GMAT)

Average GMAT scores have been on the upswing throughout the decade, increasing from 481 in 1982 to 503 in 1990 for U.S. test takers. During the same decade the number of U.S. test takers reached an all-time high of more than 160,000 in 1990; rebounding from a low of about 114,000 in 1984 (see Figures 26 & 27).

*The GMAT is a test of developed abilities that is sponsored and directed by the Graduate Management Admission Council and administered by Educational Testing Service. GMAT results provide counselors with one predictor of academic performance in graduate management school. Scores on the GMAT are currently used by about 1,000 graduate management programs throughout the world and are required of every applicant by about 780 institutions. Thus, this pool of test takers represents the vast majority of applicants to MBA or Ph.D programs in business and management fields.*

## Graduate Management Admission Test (GMAT) scores have increased steadily throughout the decade.

Figure 26
Trends in Average GMAT Scores and Volumes

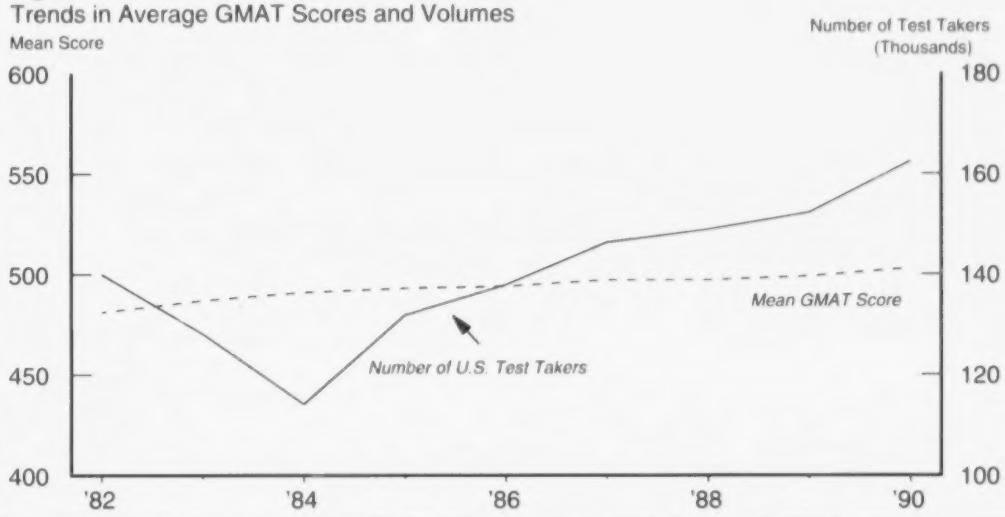
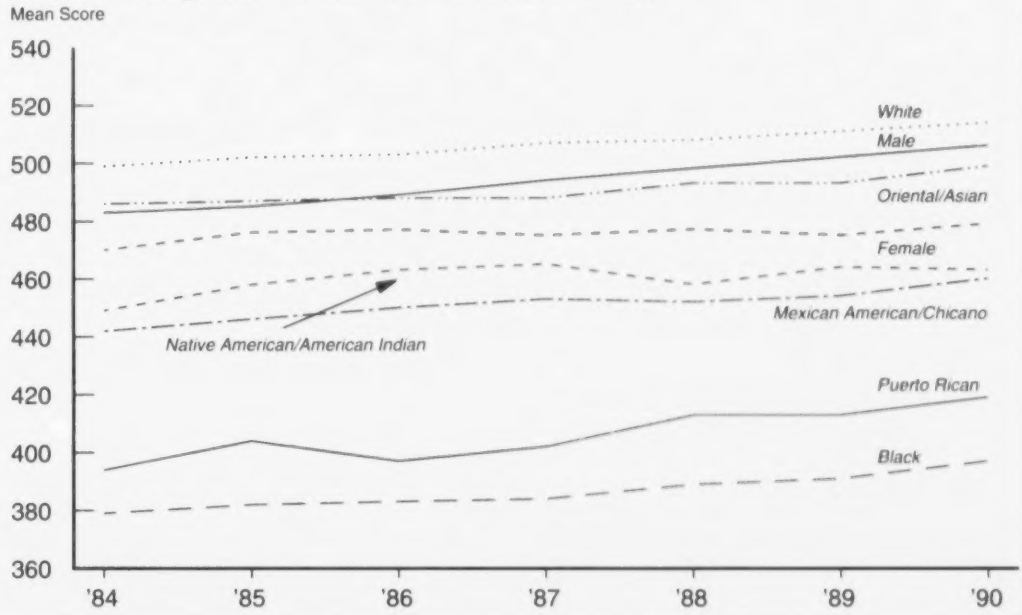



Figure 27
Trends in Average GMAT Scores by Sex and Race/Ethnicity




*Note: Mean scores for males and females are for the world population of test takers; all other scores are for U.S. citizens only.*

*Source: See Appendix Table 14.*

# Bachelor's Degrees

Key Trends for Bachelor's Degree Recipients: 1978-1988 (see Figure 28).

- Overall growth was a modest 8 percent, pushing the number of degrees to almost a million.
- Engineering degrees increased by 59 percent, computer sciences by 380 percent, and mathematics by 26 percent.
- Life and physical sciences lost ground, by 29 percent and 23 percent respectively.
- Education degrees declined by a third, while business and management rose by half. Other professional fields experienced little growth.
- The humanities were basically stable, while the social and behavioral sciences dropped 8 percent.

*The data are from "The Condition of Education, 1990," National Center for Education Statistics, and were collected through the IPEDS/ HEGIS surveys.*

**While the number of bachelor's degrees awarded grew modestly between 1978 and 1988, there were large shifts in fields of study.**

Figure 28
Bachelor's Degrees by Field of Study, 1978 and 1988

| | 1978 | 1988 | Percent Change |
|---|---|---|---|
| **Humanities & Social/Behavioral Sciences** | 300, 553 | 285,530 | -5% |
| Humanities | 143,167 | 140,299 | -2% |
| Social/Behavioral Sciences | 157,386 | 145,231 | -8% |
| **Natural & Computer Sciences & Engineering** | 149,912 | 193,764 | +29% |
| Natural Sciences | 87,057 | 70,425 | -19% |
| Life Sciences | 51,502 | 36,761 | -29% |
| Physical Sciences | 22,986 | 17,776 | -23% |
| Mathematics | 12,569 | 15,888 | +26% |
| Computer Sciences & Engineering | 62,855 | 123,339 | +96% |
| Computer & Information Sciences | 7,201 | 34,548 | +380% |
| Engineering | 55,654 | 88,791 | +59% |
| **Technical/Professional** | 470,739 | 512,267 | +9% |
| Education | 136,141 | 91,013 | -33% |
| Business & Management | 160,187 | 243,344 | +52% |
| Other Technical/Professional | 174,411 | 177,910 | +2% |
| Total | 921,204 | 993,362 | +8% |

*Source: Based on data in "The Condition of Education, 1990, Volume 2, Post-Secondary Education," National Center for Education Statistics, p. 148.*

# Graduate Education

Are the numbers of students who pursue graduate education sufficient to meet future human resource needs? One measure is what the college graduates do one year after receiving their four-year degrees (while recognizing that many such graduates will delay graduate school entry). Among all 1986 graduates, 11 percent were enrolled in school one year later, compared with 13 percent of 1980 graduates (see Figure 29).

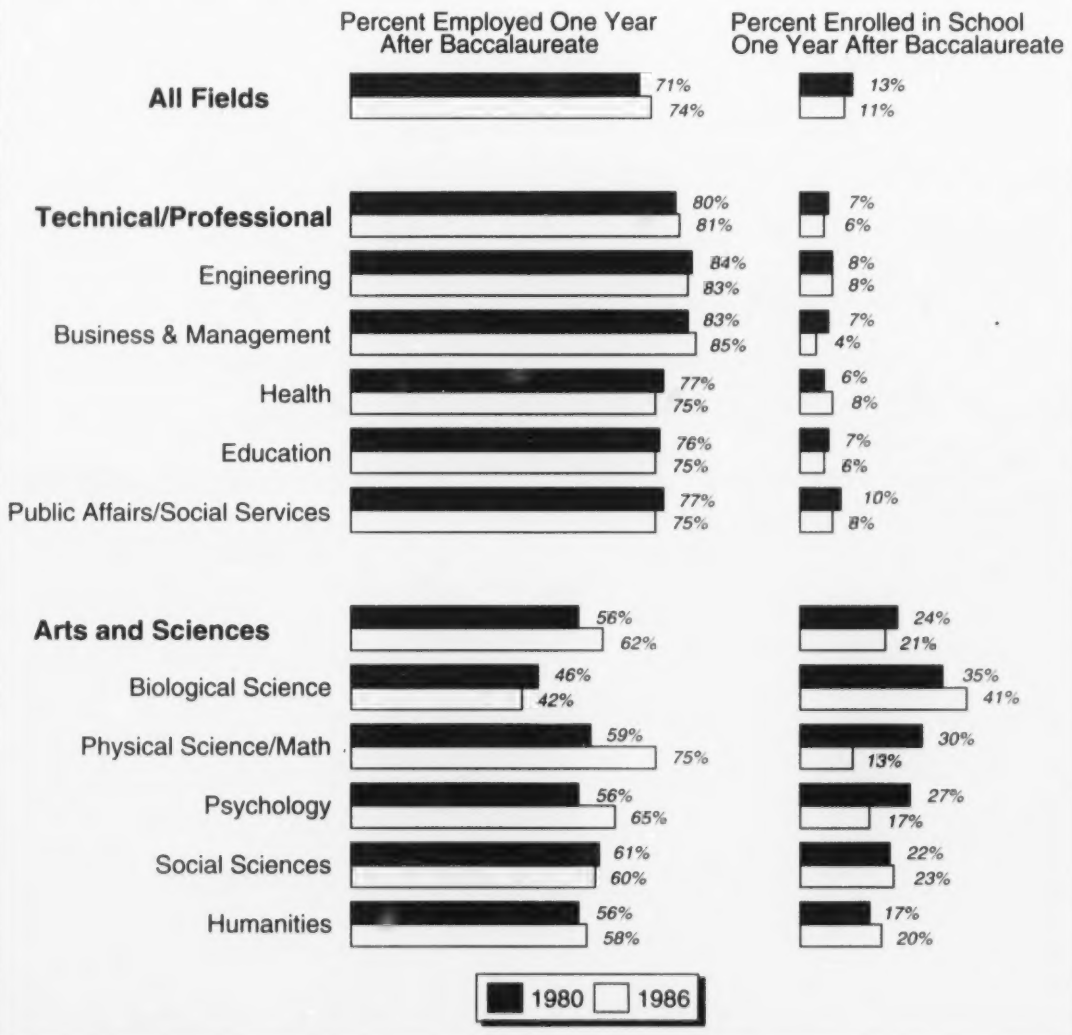
There were, however, sharp declines in enrollment in graduate programs in physical sciences/mathematics and psychology. For the former, enrollments dropped from 30 percent to 13 percent. The decline for graduate students in psychology was from 27 percent to 17 percent. Over the same period, from 1980 to 1986, the enrollment rate for biological sciences rose from 35 percent to 41 percent. No large changes occurred in the other fields.

The most significant change is in the larger proportion of physical science and mathematics graduates opting for employment rather than graduate school, rising from 59 percent to 75 percent.

*The National Center for Education Statistics collected data on college graduates one year after graduation (in 1981, 1985, and 1987). This is published in "The Condition of Education, 1990."*

**Slightly fewer 1986 baccalaureate degree recipients were enrolled in school one year later than were 1980 recipients. Sharp declines occurred in graduate school enrollment in physical science, mathematics, and psychology programs; increases occurred in biological sciences.**

Figure 29
Percentage of Baccalaureate Degree Recipients Employed Full-Time or Enrolled in School One Year After Graduation, 1980 and 1986




*Source: "The Condition of Education, 1990, Volume 2, Postsecondary Education," National Center for Education Statistics, p. 46.*

# Master's Degrees

Key Trends for Master's Degree Recipients: 1978-1988 (see Figure 30).

- Overall, there was a 4 percent decline in degrees for the decade.
- Engineering degrees increased 43 percent, and computer science tripled.
- Life sciences degrees dropped 30 percent, but physical sciences and mathematics held steady.
- Education degrees declined by 35 percent but business and management jumped 44 percent.
- The humanities and social and behavioral sciences declined by a total of 14 percent.

*The data are from "The Condition of Education, 1990," National Center for Education Statistics, and were collected through the IPEDS/ HEGIS surveys.*

## Declines in humanities degrees, large increases in computer sciences and engineering, sizeable declines in education, and increases in business and management caused a slight drop in master's degrees.

Figure 30
Master's Degrees by Field of Study, 1978 and 1988

| | 1978 | 1988 | Percent Change |
|---|---|---|---|
| **Humanities & Social/Behavioral Sciences** | 52,852 | 45,315 | -14% |
| Humanities | 30,114 | 27,160 | -10% |
| Social/Behavioral Sciences | 22,738 | 18,155 | -20% |
| **Natural & Computer Sciences & Engineering** | 35,176 | 46,511 | +32% |
| Natural Sciences | 15,740 | 13,919 | -12% |
| Life Sciences | 6,806 | 4,769 | -30% |
| Physical Sciences | 5,561 | 5,727 | +3% |
| Mathematics | 3,373 | 3,423 | +1% |
| Computer Sciences & Engineering | 19,436 | 32,592 | +67% |
| Computer & Information Sciences | 3,308 | 9,166 | +177% |
| Engineering | 16,398 | 23,426 | +43% |
| **Technical/Professional** | 223,592 | 202,763 | -9% |
| Education | 119,038 | 77,704 | -35% |
| Business & Management | 48,326 | 69,630 | +44% |
| Other Technical/Professional | 56,228 | 55,429 | -1% |
| Total | 311,620 | 298,733 | -4% |

*Source: Based on data in "The Condition of Education, 1990, Volume 2, Post-Secondary Education," National Center for Education Statistics, p. 148.*

# Doctoral Degrees

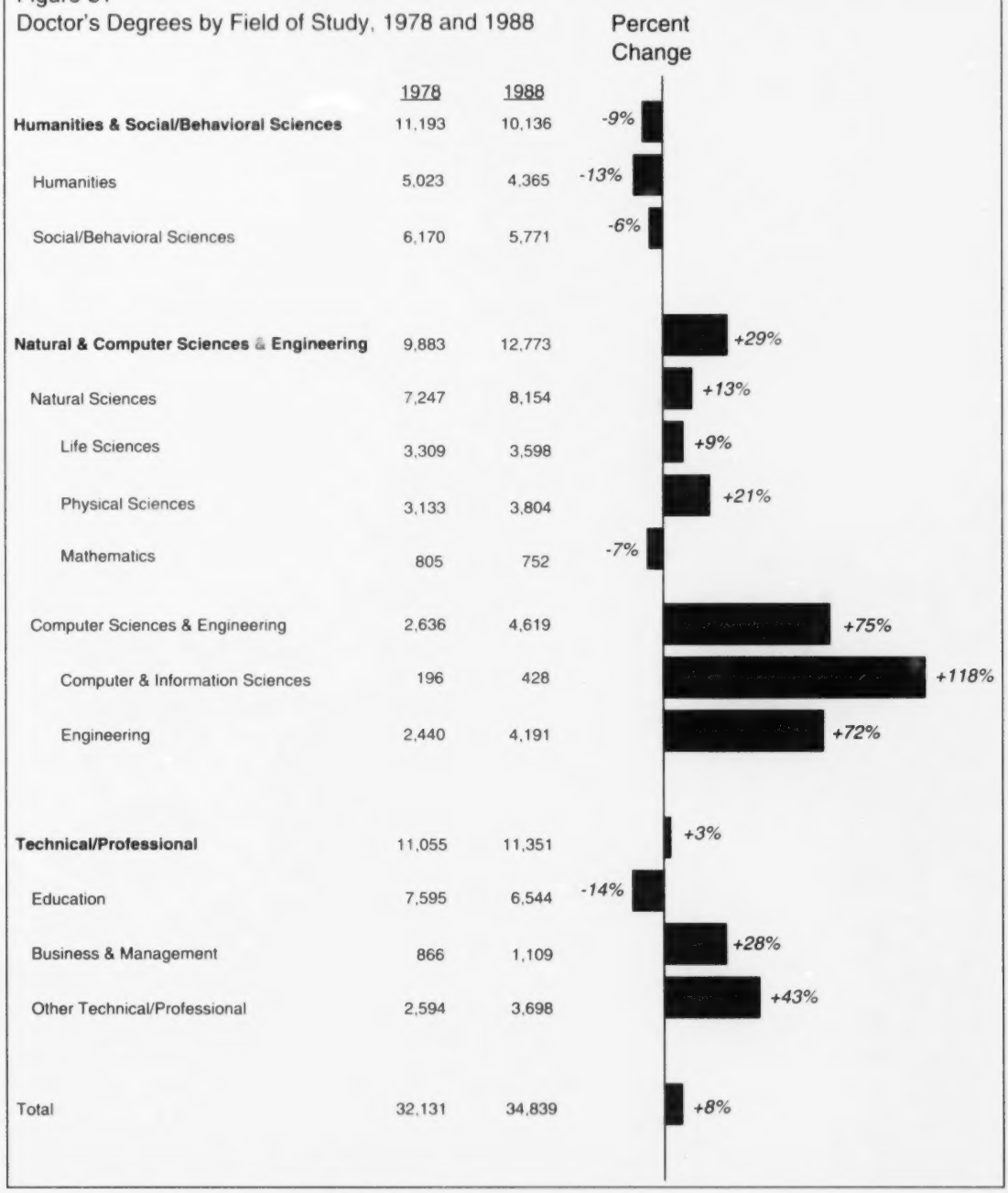
Key Trends for Doctoral Degree Recipients: 1978-1988 (see Figure 31).

- Overall, degrees awarded rose by 8 percent.
- Engineering and computer science degrees increased by 72 and 118 percent respectively.
- Mathematics degrees dropped 7 percent, while the life and physical sciences degrees increased 9 and 21 percent respectively.
- Education degrees dropped 14 percent as business and management degrees rose 28 percent, and other technical/professional degrees rose by 43 percent.
- Humanities degrees declined by 13 percent, and social and behavioral sciences degrees dropped 6 percent.

*The data are from "The Condition of Education, 1990," National Center for Education Statistics, and were collected through the IPEDS/HEGIS surveys.*

**Doctoral degrees rose 8 percent from 1978 to 1988. While gains were widespread, there were losses in the humanities, in mathematics, and in education.**

Figure 31
Doctor's Degrees by Field of Study, 1978 and 1988




| | 1978 | 1988 | Percent Change |
|---|---|---|---|
| **Humanities & Social/Behavioral Sciences** | 11,193 | 10,136 | -9% |
| Humanities | 5,023 | 4,365 | -13% |
| Social/Behavioral Sciences | 6,170 | 5,771 | -6% |
| **Natural & Computer Sciences & Engineering** | 9,883 | 12,773 | +29% |
| Natural Sciences | 7,247 | 8,154 | +13% |
| Life Sciences | 3,309 | 3,598 | +9% |
| Physical Sciences | 3,133 | 3,804 | +21% |
| Mathematics | 805 | 752 | -7% |
| Computer Sciences & Engineering | 2,636 | 4,619 | +75% |
| Computer & Information Sciences | 196 | 428 | +118% |
| Engineering | 2,440 | 4,191 | +72% |
| **Technical/Professional** | 11,055 | 11,351 | +3% |
| Education | 7,595 | 6,544 | -14% |
| Business & Management | 866 | 1,109 | +28% |
| Other Technical/Professional | 2,594 | 3,698 | +43% |
| Total | 32,131 | 34,839 | +8% |

*Source: Based on data in "The Condition of Education, 1990, Volume 2, Post-Secondary Education," National Center for Education Statistics, p. 154.*

# Degree Attainment by U.S. Citizens

Some of the statistics on previous pages include students from outside the U.S. As can be seen in Figure 32, the proportion of higher education students from other countries is increasing and becomes a factor in judging the sufficiency of the number of U.S. citizens who pass through our higher education system.

Nearly half of doctoral degrees in engineering went to foreign students in 1987, as did 44 percent of mathematics doctorates, 34 percent of those in computer and information sciences, and 27 percent of those in physical sciences (see Figure 33). This is a tribute to the high international reputation of American higher education in the world. Not all foreign students leave the U.S.; in 1987 13 percent of doctorate recipients in natural sciences, physical sciences, and engineering planned to work in the U.S., as did 17 percent of those in other fields. Many others plan postdoctoral study in the U.S.

*As used here, foreign students are non-United States citizens holding temporary U.S. visas. The data, published in "The Condition of Education, 1990," comes from "Science and Engineering Doctorates: 1960-88" and unpublished tabulations from National Research Council, "Survey of Earned Doctorates."*

**The proportion of U.S. degrees awarded to foreign students has nearly doubled for all degree levels. Nearly one in five doctoral recipients is from a country outside the U.S.**

Figure 32
Percentage of Degrees Earned by Students from outside the U.S., 1977 to 1987

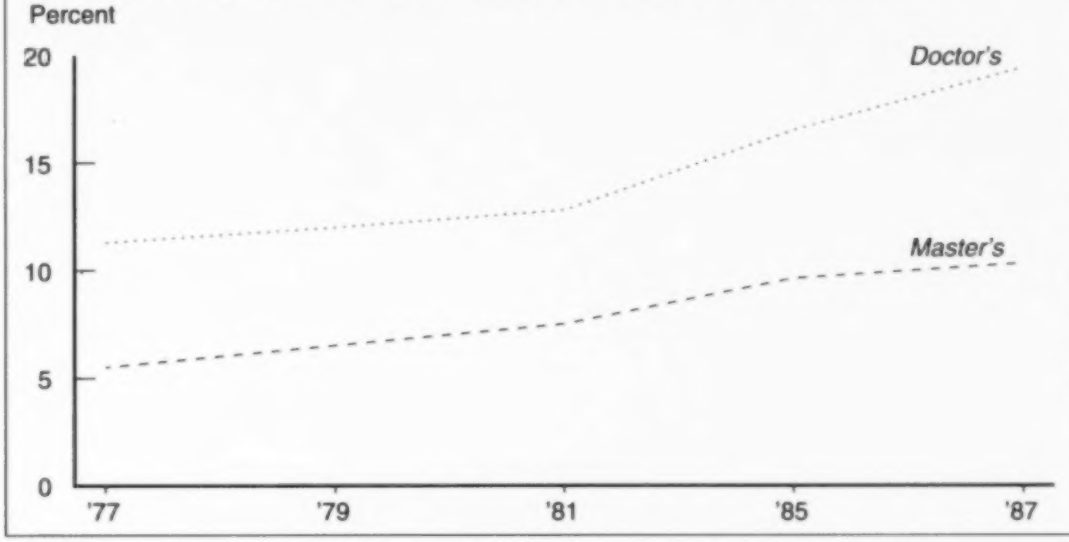
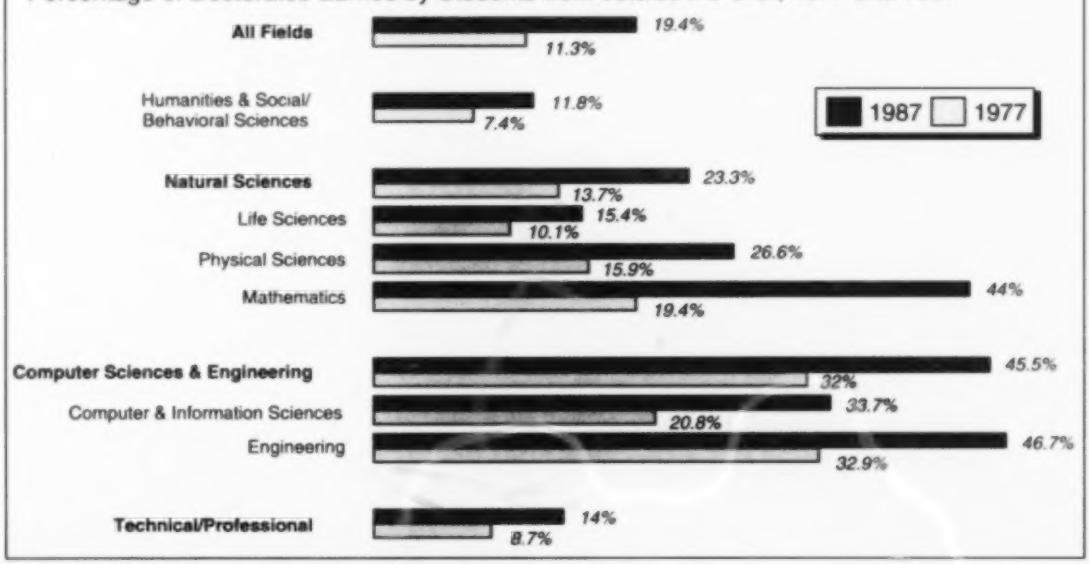



Figure 33
Percentage of Doctorates Earned by Students from outside the U.S., 1977 and 1987




*Sources: For Figure 32, see Appendix Table 21. Figure 33 is from "The Condition of Education, 1990, Volume 2, Postsecondary Education," National Center for Education Statistics, p. 64.*

# Higher Education Participation

The enrollment of young male high school graduates in four-year institutions of higher education has fluctuated between 24 and 26 percent from 1973 to 1988, although the rate moved slightly upward in the 1980s. For females, the rate has been generally upward, particularly since the mid-1980s and now equals that of men (see Figure 34). Around 3 percent of 25-34-year-old male high school graduates were enrolled in college throughout the 1980s, down slightly from the 1970s. For females, the rate varied around 2.5 percent in the 1980s, but was higher than in the early 1970s (see Figure 34).

The enrollment rates, into both two- and four-year institutions, have long been trending upward for 16-24-year-old White females. The rate for White males rose in the 1980s. The rate for Black male graduates has been unsteady with no clear trend, and the rate for Black females has been holding at about 30 percent since 1975 (see Figure 35).

*The enrollment data, drawn from "The Condition of Education, 1990," published by the National Center for Education Statistics, is collected through the household surveys of the U.S. Bureau of the Census, and reported in "Current Population Reports," Series P-20. For a thorough analysis of enrollment trends for Black males see the recent analysis in "Trends in the Postsecondary Enrollment of Minorities" by Daniel Koretz of the Rand Corporation.*

**By 1988, about one in four young high school graduates (age 16-24) were enrolled in four-year colleges, with females about even with males; the percentages enrolled increased for both sexes in the 1980s. However, the percentage of 25-34-year-olds enrolled was stable in the 1980s.**

Figure 34
Percentage of 16-24-Year-Olds and 25-34-Year-Olds Enrolled in Four-Year Colleges, by Sex, 1973-1988

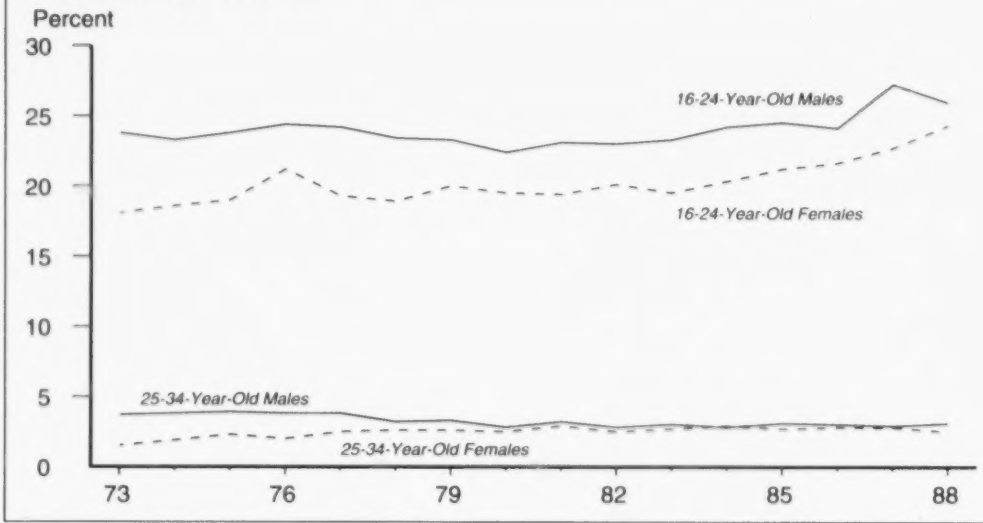
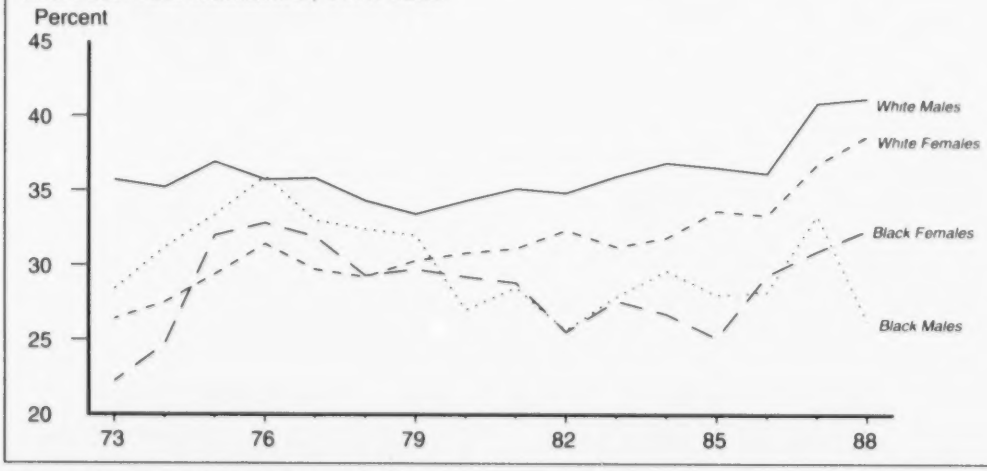



Figure 35
Percentage of White and Black High School Graduates Aged 16-24 Enrolled in Two- and Four-Year Institutions, 1973-1988




*Sources: See Appendix Tables 18 and 19.*

# Higher Education Completions by Race and Sex

One in four young American high school graduates, age 25-29, complete four years of college. This ratio remained unchanged in the 1980s, but is somewhat below the peaks reached in the mid-1970s, boosted by high college enrollment for males during the Vietnam war (see Figure 36). Male and female completion rates are now virtually equal, with steady increases occurring for females from 1965 to 1975.

Completion rates for Black high school graduates have varied within a narrow band around 15 percent since 1975 (see Figure 37). However, completion rates for Black male graduates averaged 13.7 percent from 1985 to 1987, compared with an average of 16 percent from 1982 to 1984.

Rates for Hispanic graduates fluctuated within a range of from 11 to 18 percent from 1974 to 1987, with no evident trend.

*The college completion data, drawn from "The Condition of Education, 1990," published by the National Center for Education Statistics, is collected through the household surveys of the Census, and reported in "Current Population Reports, Series P-20".*

**About one in four young American males and females have completed four years of college, little changed in the 1980s, but lower than the peaks achieved in the mid 1970s. Rates for Blacks were basically stable at a lower level, although the decade ended below peak levels; Hispanic rates showed no clear trend.**

Figure 36
Percentage of 25-29-Year-Old High School Graduates Completing Four Years of College, by Sex

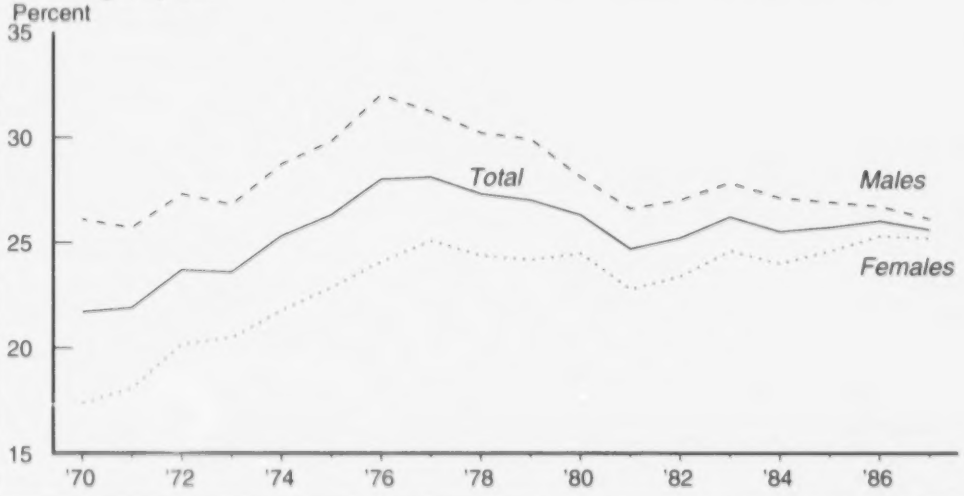
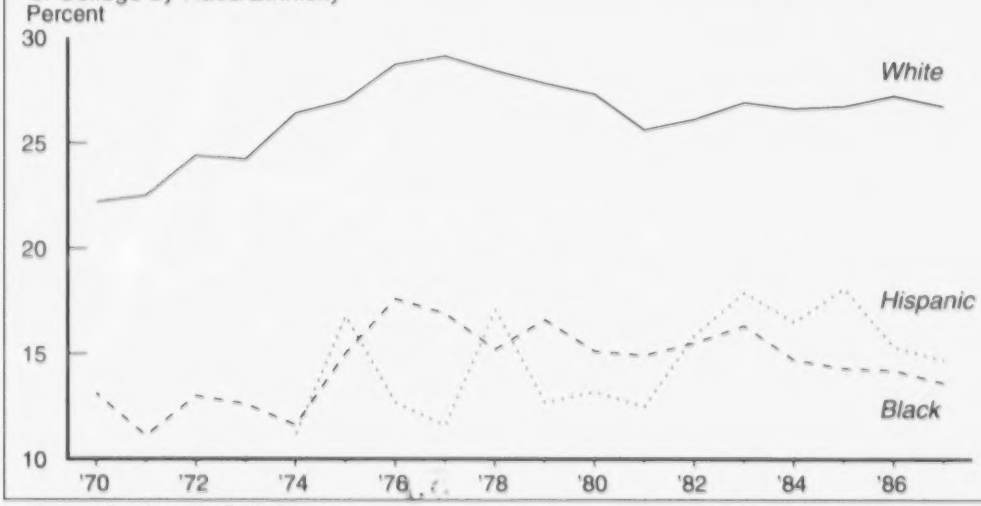



Figure 37
Percentage of 25-29-Year-Old High School Graduates Completing Four Years of College by Race/Ethnicity




*Source: See Appendix Table 20.*

# Attainment of Bachelor's and Advanced Degrees

The "Condition of Education, 1990" brought together two sets of data that summarize how the attainment of bachelor's and advanced degrees has kept pace with population growth. The report compares changes in degrees awarded from 1977 to 1987 with changes in the population of adults between the ages of 20 and 34.

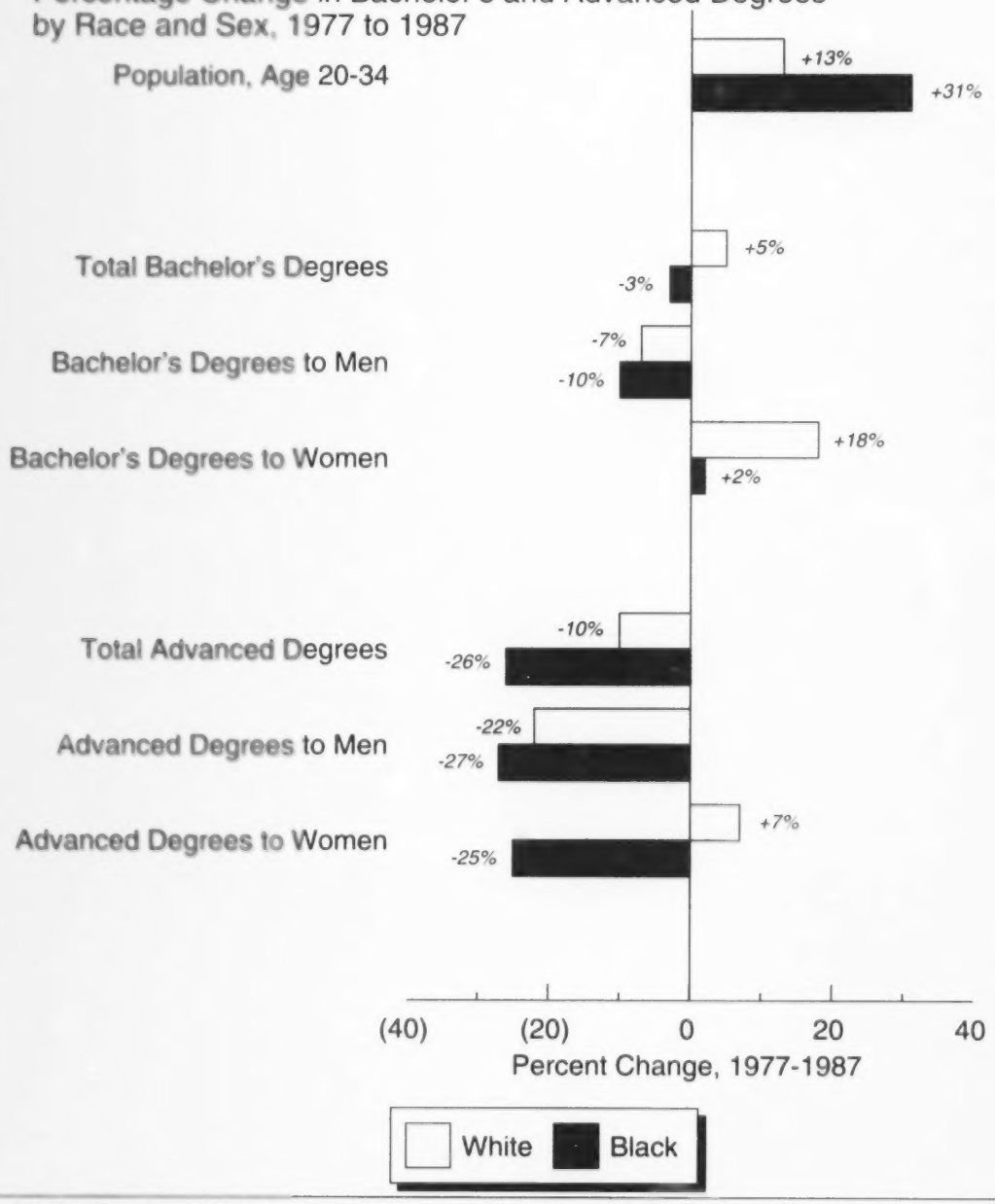
For bachelor's degrees, White women have kept pace and exceeded population growth. But White men lost ground relative to population growth as did Black men, and Black women gained only 2 percent in degrees, compared to a population increase of 31 percent (see Figure 38).

There was a sharp decline in advanced degrees conferred on White men and much sharper declines in degrees conferred on Black men and women (compared to a much larger increase in their population). Only White women achieved an increase in degrees conferred, but it was less than their population growth. In interpreting the data it is necessary to keep in mind that the 20-34-year-old population is used for comparison and that it does not precisely match the ages of those enrolled in colleges and universities.

*The "Condition of Education, 1990" used data from IPEDS/HEGIS surveys for degrees conferred and population estimates from the Bureau of the Census. Degree data are based on Whites and Blacks of non-Hispanic origin, whereas population estimates are for all Whites and Blacks.*

**Attainment of bachelor's and advanced degrees among 20-34-year-olds has not kept pace with population growth from 1977 to 1987.**

Figure 38
Percentage Change in Bachelor's and Advanced Degrees by Race and Sex, 1977 to 1987




*Source: "The Condition of Education, 1990, Volume 2, Postsecondary Education," National Center for Education Statistics, p.40.*

# Higher Education Degrees

In 1988, 1.8 million higher education degrees were awarded, up 5 percent from 1978. The 1978 and 1988 degrees awarded and population changes in that period are shown in Figure 39.

There was an increase in the attainment of associate and bachelor's degrees, despite a 7 percent decline in the population between the ages of 20 and 24. This reflects both a higher rate of college attendance and an increase in the number of older persons returning to school.

The number of master's degrees awarded declined by 4 percent from 1978 to 1988, and this may lower the number of doctorates awarded subsequently. While the number of doctorates awarded rose by 8 percent, the population aged 25 to 34 grew much more rapidly, by 26 percent.

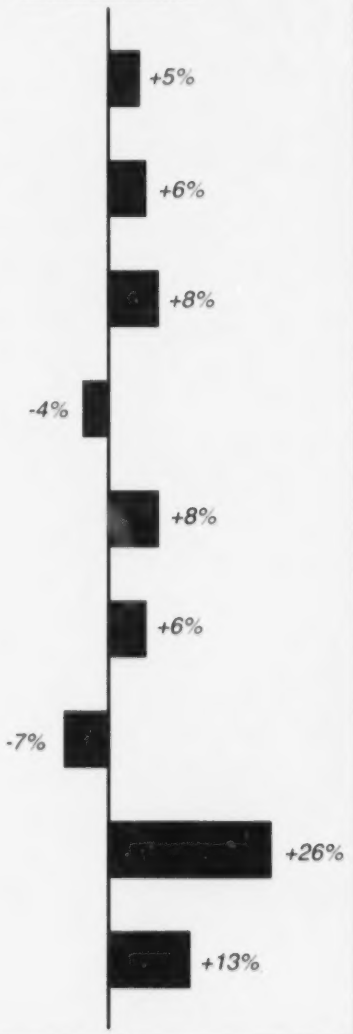
The fact that it takes longer now than previously to obtain advanced degrees and the fact that more older adults are reentering school make it difficult to compare degrees awarded and population growth. Figure 39 shows comparisons with groups aged 20-24, 25-34, and 20-34. The demographic patterns are quite different for these groups.

*The data used to calculate percentages for Figure 39 are from "The Condition of Education, 1990." Degree data are from the IPEDS/HEGIS surveys, and the population data is from the Bureau of the Census.*

**More associate and bachelor's degrees were awarded in 1988 than in 1978, despite a decline in the 20-24-year-old population. However, fewer master's degrees were awarded, and the increase in doctoral degrees and first professional degrees did not keep pace with the growth in the population aged 25-34.**

Figure 39
Number of Degrees Conferred at Institutions of Higher Education and Percent Change, 1978 and 1988

| | Number of Degrees | | Percent Change |
|---|---|---|---|
| | 1978 | 1988 | |
| Total Degrees | 1,743,782 | 1,832,886 | +5% |
| Associate Degrees | 412,246 | 435,537 | +6% |
| Bachelor's Degrees | 921,204 | 993,362 | +8% |
| Master's Degrees | 311,620 | 298,733 | -4% |
| Doctoral Degrees | 32,131 | 34,839 | +8% |
| First Professional | 66,581 | 70,415 | +6% |
| | Populations | | |
| Population, 20-24 | 20,946,000 | 19,374,000 | -7% |
| Population, 25-34 | 34,963,000 | 43,886,000 | +26% |
| Population, 20-34 | 55,909,000 | 63,260,000 | +13% |



*Source: Derived from "The Condition of Education, 1990, Volume 2, Postsecondary Education," National Center for Education Statistics, pp. 145 and 147.*

# SUMMARY

Below is a condensed summary of the information presented, together with references to the appropriate pages in the report.

**ELEMENTARY SCHOOL**

- In reading, approximately one in six 9-year-olds could search for specific information, interrelate ideas, and make generalizations. The percentage of students performing at this level changed little from 1971 to 1988. See pages 4 and 5.
- From 1978 to 1986, approximately one in five 9-year-olds were able to perform basic operations and beginning problem solving in mathematics. See pages 6 and 7.
- In science, just over one in four 9-year-olds could apply basic scientific information — a proportion that remained essentially the same from 1977 to 1986. See pages 8 and 9.

**JUNIOR HIGH SCHOOL**

- In reading, about one in 10 13-year-olds could find, understand, summarize, and explain relatively complicated information. The percentage of students performing at this level of reading performance remained fairly constant from 1971 to 1988. See pages 10 and 11.
- In U.S. history, one in eight eighth graders can understand basic terms and historical relationships. See pages 12 and 13.
- In civics, one in eight eighth graders can understand specific government structures and relationships. See pages 12 and 13.
- The percentage of American 13-year-olds who understand measurement and geometry concepts and who can analyze scientific knowledge and principles was among the lowest of many countries in the developed world. See pages 14 and 15.
- One in 11 American 13-year-olds (9.2 percent) reached the level in mathematics where they understand measurement and geometry concepts and can solve more complex problems. Two in five can do so in Korea. See pages 14 and 15.
- One in eight (11.8 percent) reached the level in science where they understand and can apply intermediate scientific knowledge and principles. Three in ten could do so in Korea. See pages 14 and 15.

**HIGH SCHOOL**

- Few 17-year-old students demonstrated high levels of performance in reading, mathematics, and science. Further, there appears to have been a slight decline across time in the percentage of highly skilled readers. See pages 16 and 17.
- Few 12th-grade students demonstrated a broad understanding of American institutions of government and were able to interpret U.S. historical information and ideas. See page 18.
- Few 12th-grade students displayed an ability to produce elaborated — rather than simply adequate — responses to various writing tasks. See page 19.
- Advanced Placement (AP) scores have been remarkably stable during a time of tremendous growth in participation in the program. Minority student participation in AP has grown steadily. See pages 20 and 21.

**HIGH SCHOOL TO COLLEGE**

- Trends in the percentage of high scorers on the SAT (600 or over) and ACT (27 or over) college admissions tests do not follow a clear or consistent pattern. See pages 22 and 23.
- Eight percent of our high school seniors take the Achievement Tests offered by the Admissions Testing Program of the College Board. Their average scores on the SAT

Verbal and Math sections are much higher than other students' scores and have been increasing overall. See pages 24 and 25.

- The percentage of 1980 high school seniors continuing their education was similar to that of 1972 seniors, except for a decline in minority students pursuing higher education. See pages 26 and 27.
- One in four 1980 high school graduates were estimated to have received a bachelor's degree by 1987, and one in 20 entered graduate level studies. See pages 28 and 29.
- Among high ability seniors (those in the top quartile), about half received bachelor's degrees and one in eight enrolled in graduate level programs. See pages 30 and 31.

**BACHELOR LEVEL EDUCATION**

- Graduate Record Examination (GRE) scores on the general examination increased between 1981 and 1990 at the same time that the number of test-takers rose. See pages 32 and 33.
- On the Graduate Record Examination Subject Tests, results were mixed. Scores rose in seven subject-area tests, fell in seven subjects, and were stable in one subject. The number of test-takers increased for seven subjects and decreased for eight. See pages 34 and 35.
- Graduate Management Admission Test (GMAT) scores have increased steadily throughout the decade. See pages 36 and 37.
- While the number of bachelor's degrees awarded grew modestly between 1978 and 1988, there were large shifts in the major fields of study, toward engineering, computer sciences, business and management and away from life and physical sciences, education, and social/behavioral sciences. See pages 38 and 39.

**GRADUATE EDUCATION**

- Slightly fewer 1986 baccalaureate degree recipients were enrolled in school one year later than were 1980 recipients. Sharp declines occurred in graduate school enrollment in physical sciences/mathematics and psychology programs; increases occurred in biological sciences. See pages 40 and 41.
- As a result of declines in humanities degrees, the number of master's degrees awarded between 1978 and 1988 dropped slightly, the net result of large increases in computer sciences and engineering, sizeable declines in education, and increases in business and management. See pages 42 and 43.
- Doctoral degrees rose 8 percent from 1978 to 1988. While the gains were widespread, there were losses in the humanities, in mathematics, and in education. See pages 44 and 45.
- The proportion of U.S. degrees awarded to students from a country outside the U.S. nearly doubled for all degree levels and was highest for doctorates, where almost one in five recipients was a foreign student in 1987. The highest proportions were for engineering (47 percent), mathematics (44 percent), and computer and information sciences (34 percent). See pages 46 and 47.

**HIGHER EDUCATION: RACE AND GENDER**

- By 1988, about one in four young adults (ages 16-24) who had graduated from high school were enrolled in four-year colleges, with females about even with males; the percentages enrolled increased for both sexes in the 1980s. However, the percentage of 25-34 year-olds enrolled was stable during the 1980s. See pages 48 and 49.
- About one in four young American males and females have completed four years of college, a figure that changed little in the 1980s, but that was lower than the peaks achieved in the mid-1970s. Rates for Blacks were basically stable at a lower level, although the decade ended below peak levels. Hispanic rates showed no clear trend. See pages 50 and 51.
- Bachelor's degree awards declined for both White and Black men between 1977 and 1987, but increased considerably for White women (18 percent) and slightly for Black women (2 percent). Advanced degrees dropped sharply for men (both White and Black) and Black women, but rose 7 percent for White women. See pages 52 and 53.

**SUMMARY: HIGHER EDUCATION DEGREES**

- More associate's and bachelor's degrees were awarded in 1988 than in 1978, despite a decline in the youth population (age 20-24). However, fewer master's degrees were awarded, and the increase in doctoral degrees and first professional degrees did not keep pace with the growth in the population aged 25-34. See pages 54 and 55.

To offer an assessment of the adequacy of these levels of achievement against national needs would be an undertaking that reaches beyond the scope of this report. Analysis, judgments, and projections have been made, and often differ; debates rage about these projections and analyses across the continuum of education.

There are few certainties that can be established, particularly where projections and forecasts are involved. For example, *Newsweek* recently reported that, "It is now an article of faith that a shortage of technically savvy manpower is undermining America's competitiveness and national security." As a counterpoint, Professor Rustum Ray, a member of the National Academy of Engineering, was reported as observing that, "there is a gross overemphasis on making more scientists when we probably have too many today."

As another example, commonly accepted projections of teacher shortages recently have been sharply criticized, and while the Office of Technology Assessment recently alleged there is a serious underinvestment in training in U.S. industry, a recent survey of American businesses by the National Center on Education and the Economy found that only 5 percent thought that education and skill requirements were increasing significantly. It is out of such analysis, disagreement, and debate that policies are formulated and decisions are made.

A national consensus on education goals has been emerging since the Education Summit held by President Bush and the nation's governors in the fall of 1989. Goals have been established and a mechanism created to monitor their attainment throughout the decade. More than any time in the past, the nation as a whole is becoming clearer about what it needs and wants to accomplish. Sufficient high-level talent is one of these needs.

**ERRATUM**

**In Figure 6 on page 9, the percentage of White 9-year-olds at or above Level 250 should be 33 percent. The same change should be made to Appendix Table 8 on page 59.**

Table 3

# Appendix

Table 1: Percentage of 9-Year-Old Students at or above Level 250 on the NAEP Reading Scale

| | 1971 | 1975 | 1980 | 1984 | 1988 |
|---|---|---|---|---|---|
| All Students | 15.3 (0.5) | 14.6 (0.5) | 17.2 (0.8) | 17.0 (0.6) | 17.0 (0.9) |
| Males | 11.8 (0.5) | 11.3 (0.5) | 14.1 (0.8) | 15.8 (0.7) | 15.7 (1.2) |
| Females | 18.7 (0.7) | 17.9 (0.6) | 20.2 (0.9) | 18.1 (0.7) | 18.4 (1.0) |
| White | 17.7 (0.6) | 17.6 (0.5) | 20.5 (0.8) | 20.8 (0.7) | 19.7 (1.2) |
| Black | 2.1 (0.3) | 1.9 (0.2) | 3.6 (0.5) | 4.2 (0.5) | 5.9 (0.8) |
| Hispanic | | 2.2 (0.5) | 4.4 (1.0) | 3.8 (0.4) | 8.2 (1.9) |
| Northeast | 17.9 (0.8) | 17.4 (1.0) | 20.9 (2.3) | 19.3 (1.4) | 19.7 (1.5) |
| Southeast | 9.8 (1.1) | 10.2 (0.7) | 15.1 (1.2) | 13.7 (1.2) | 14.1 (1.1) |
| Central | 19.5 (0.7) | 17.0 (0.8) | 18.1 (0.8) | 19.0 (1.4) | 20.8 (3.1) |
| West | 12.2 (1.3) | 12.8 (1.2) | 15.1 (1.4) | 16.2 (1.1) | 14.3 (0.9) |
| Parent Not H.S. Grad | 6.5 (0.6) | 5.5 (0.6) | 6.6 (0.7) | 7.1 (0.6) | 6.4 (1.7) |
| Parent H.S. Grad | 13.1 (0.8) | 13.8 (0.6) | 14.2 (0.9) | 14.1 (0.7) | 16.7 (1.6) |
| Parent Post H.S. | 25.9 (0.9) | 22.2 (0.7) | 25.0 (1.0) | 26.0 (0.9) | 22.6 (1.4) |

*Source: "The Reading Report Card, 1971-1988," National Assessment of Educational Progress, Educational Testing Service, 1990.*

Table 2: Percentage of 9-Year-Old Students at or above Level 250 on the NAEP Mathematics Scale

| | 1978 | 1982 | 1986 |
|---|---|---|---|
| All Students | 19.4 (0.6) | 18.7 (0.8) | 20.8 (0.9) |
| Males | 18.9 (0.5) | 18.2 (0.9) | 20.6 (0.9) |
| Females | 19.8 (0.7) | 19.2 (0.9) | 20.9 (1.1) |
| White | 22.5 (0.7) | 21.5 (0.9) | 24.5 (1.0) |
| Black | 4.3 (0.5) | 4.5 (0.5) | 5.4 (0.7) |
| Hispanic | 10.8 (1.3) | 9.2 (1.1) | 8.0 (2.5) |
| Northeast | 24.9 (1.0) | 23.6 (1.3) | 25.0 (2.6) |
| Southeast | 13.1 (0.7) | 13.5 (1.6) | 17.1 (2.2) |
| Central | 23.0 (1.2) | 19.2 (2.0) | 24.8 (1.7) |
| West | 15.6 (1.0) | 19.0 (1.2) | 16.2 (2.0) |
| Parent Not H.S. Grad | 7.8 (0.8) | 7.6 (0.7) | 6.2 (2.0) |
| Parent H.S. Grad | 19.2 (1.0) | 16.2 (0.9) | 17.4 (1.4) |
| Parent Post H.S. | 29.0 (1.4) | 24.3 (2.7) | 26.4 (2.0) |
| Parent College Grad | 30.9 (1.1) | 27.1 (1.2) | 29.4 (1.2) |

*Source: "The Mathematics Report Card: Are We Measuring Up?" National Assessment of Educational Progress, Educational Testing Service, 1988.*

Table 3: Percentage of 9-Year-Old Students at or above Level 250 on the NAEP Science Scale

| | 1977 | 1982 | 1986 |
|---|---|---|---|
| All Students | 26.2 (0.7) | 24.8 (1.7) | 27.6 (1.0) |
| Males | 27.6 (0.7) | 25.9 (2.3) | 29.4 (1.3) |
| Females | 24.8 (0.7) | 23.7 (1.8) | 25.8 (1.2) |
| White | 31.3 (0.6) | 17.6 (0.5) | 20.5 (0.8) |
| Black | 8.5 (1.6) | 4.4 (2.3) | 10.7 (1.9) |
| Hispanic | 3.8 (0.5) | 3.8 (1.0) | 8.8 (0.9) |
| Northeast | 29.2 (1.0) | 25.7 (2.9) | 31.3 (2.6) |
| Southeast | 18.3 (1.4) | 21.3 (3.4) | 25.0 (2.6) |
| Central | 29.5 (1.4) | 29.6 (2.6) | 28.6 (1.8) |
| West | 25.6 (1.2) | 22.0 (4.4) | 25.8 (2.2) |
| Parent Not H.S. Grad | 13.6 (1.0) | 7.1 (2.2) | 9.2 (1.4) |
| Parent H.S. Grad | 27.4 (1.0) | 20.7 (2.6) | 24.4 (1.3) |
| Parent Post H.S. | 40.2 (1.4) | 35.9 (4.2) | 39.2 (3.2) |
| Parent College Grad | 35.6 (1.0) | 33.1 (2.5) | 36.2 (1.2) |

*Source: "The Science Report Card: Elements of Risk and Recovery," National Assessment of Educational Progress, Educational Testing Service, 1990.*

Table 4: Percentage of 13-Year-Old Students at or above Level 300 on the NAEP Reading Scale

| | 1971 | 1975 | 1980 | 1984 | 1988 |
|---|---|---|---|---|---|
| All Students | 9.8 (0.5) | 10.3 (0.4) | 11.3 (0.4) | 10.9 (0.4) | 10.6 (0.7) |
| Males | 7.3 (0.4) | 7.0 (0.4) | 9.1 (0.4) | 8.9 (0.4) | 8.2 (0.8) |
| Females | 12.2 (0.6) | 13.6 (0.6) | 13.5 (0.5) | 13.1 (0.5) | 13.0 (0.8) |
| White | 11.3 (0.5) | 12.0 (0.5) | 13.6 (0.5) | 13.3 (0.5) | 12.3 (0.8) |
| Black | 0.9 (0.2) | 1.7 (0.3) | 1.5 (0.2) | 2.1 (0.3) | 4.0 (0.9) |
| Hispanic | -- | 2.3 (0.8) | 1.9 (0.4) | 3.9 (0.4) | 3.1 (0.9) |
| Northeast | 12.7 (1.1) | 11.6 (1.2) | 12.1 (0.9) | 12.0 (0.5) | 12.2 (1.6) |
| Southeast | 6.4 (0.5) | 7.9 (0.7) | 9.0 (0.9) | 11.6 (1.2) | 9.9 (1.5) |
| Central | 11.6 (1.0) | 12.4 (0.9) | 14.2 (0.5) | 10.5 (0.5) | 8.5 (1.1) |
| West | 7.8 (0.7) | 8.6 (0.6) | 9.7 (0.8) | 9.5 (0.9) | 11.8 (1.3) |
| Parent Not H.S. Grad | 3.0 (0.3) | 3.1 (0.4) | 2.4 (0.3) | 3.2 (0.4) | 5.9 (1.3) |
| Parent H.S. Grad | 8.0 (0.5) | 7.7 (0.4) | 6.5 (0.3) | 7.5 (0.4) | 6.0 (0.7) |
| Parent Post H.S. | 16.8 (0.7) | 17.3 (0.6) | 18.1 (0.7) | 16.8 (0.6) | 15.4 (1.2) |

*Source: "The Reading Report Card, 1971-1988," National Assessment of Educational Progress, Educational Testing Service, 1990.*

Note: Jackknifed standard errors are presented in parentheses.

Table 5: Percentage of 8th Grade Students at or above Level 300 on the NAEP History and Civics Scales, 1988

| | History | Civics |
|---|---|---|
| All | 12.7 (0.5) | 12.7 (0.7) |
| Male | 15.7 (0.8) | 14.1 (1.0) |
| Female | 9.8 (0.6) | 11.4 (0.8) |
| White | 15.7 (0.6) | 16.3 (1.0) |
| Black | 3.5 (0.7) | 4.0 (0.7) |
| Hispanic | 4.1 (0.8) | 3.4 (0.9) |
| NE | 17.2 (1.0) | 16.0 (1.7) |
| SE | 8.9 (1.2) | 9.5 (1.6) |
| C | 12.9 (1.0) | 15.4 (1.3) |
| W | 12.1 (0.9) | 10.6 (1.2) |

*Sources: "The History Report Card" and "The Civics Report Card," National Assessment of Educational Progress, Educational Testing Service, 1990.*

Table 6: Percentage of 13-Year-Old Students at or above Level 600 on the IAEP Mathematics and Science Scales, 1988

| | Mathematics | Science |
|---|---|---|
| British Columbia | 23.8 (1.1) | 30.6 (1.0) |
| Ireland | 14.2 (1.0) | 9.1 (0.9) |
| Korea | 39.6 (1.3) | 32.6 (1.3) |
| New Brunswick (Eng) | 17.8 (1.1) | 14.9 (0.9) |
| New Brunswick (Fren) | 11.6 (1.2) | 6.8 (0.8) |
| Ontario (Eng) | 16.0 (1.3) | 17.1 (1.1) |
| Ontario (Fren) | 7.0 (0.7) | 6.1 (0.6) |
| Quebec (Eng) | 20.2 (1.0) | 14.8 (0.8) |
| Quebec (Fren) | 21.8 (1.3) | 15.2 (1.3) |
| Spain | 14.3 (1.8) | 12.2 (1.3) |
| UK | 18.4 (1.2) | 21.3 (1.4) |
| US | 9.2 (1.0) | 11.8 (1.1) |

*Source: "A World of Differences: An International Assessment of Mathematics and Science," Educational Testing Service, January 1989.*

Table 7: Percentage of 17-Year-Old Students at or above Level 350 on the NAEP Reading, Mathematics, and Science Scales

| | Reading | Mathematics | Science |
|---|---|---|---|
| 1971 | 6.6 (0.4) | | |
| 1972 | | | |
| 1973 | | | |
| 1974 | | | |
| 1975 | 6.1 (0.2) | | |
| 1976 | | | |
| 1977 | | | 8.5 (0.4) |
| 1978 | | 7.4 (0.4) | |
| 1979 | | | |
| 1980 | 5.3 (0.4) | | |
| 1981 | | | |
| 1982 | | 5.4 (0.4) | 7.2 (0.4) |
| 1983 | | | |
| 1984 | | | |
| 1985 | | | |
| 1986 | | 6.4 (0.4) | 7.5 (0.6) |
| 1987 | | | |
| 1988 | 4.8 (0.4) | 6.5 (1.0) | 8.2 (1.0) |

*Source: "The Reading Report Card," "The Mathematics Report Card," and "The Science Report Card," National Assessment of Educational Progress, Educational Testing Service.*

Table 8: Number of Advanced Placement Candidates, Average Examination Grade, and Minority Student Participation

| | Number of AP Candidates | Average AP Exam Grade | Percent American Indian | Percent Asian American | Percent Black | Percent Hispanic |
|---|---|---|---|---|---|---|
| '78 | 93,342 | 3.16 | 0.20 | 3.6 | 2.0 | 1.6 |
| '79 | 106,093 | 3.14 | 0.20 | 3.9 | 2.0 | 1.8 |
| '80 | 120,245 | 3.12 | 0.25 | 4.3 | 2.1 | 2.1 |
| '81 | 134,005 | 3.12 | 0.24 | 4.8 | 2.1 | 2.1 |
| '82 | 141,907 | 3.12 | 0.24 | 5.4 | 2.3 | 2.4 |
| '83 | 158,112 | 3.13 | 0.23 | 5.9 | 2.4 | 2.8 |
| '84 | 176,282 | 3.12 | 0.25 | 6.5 | 2.5 | 3.0 |
| '85 | 203,369 | 3.06 | 0.25 | 7.1 | 2.7 | 3.2 |
| '86 | 228,606 | 3.09 | 0.24 | 7.9 | 2.8 | 3.4 |
| '87 | 259,222 | 3.08 | 0.25 | 8.1 | 3.1 | 3.7 |
| '88 | 288,372 | 3.06 | 0.28 | 9.5 | 3.6 | 4.6 |
| '89 | 309,751 | 3.02 | 0.32 | 10.4 | 3.8 | 5.3 |
| '90 | 323,736 | 3.05 | 0.36 | 11.4 | 4.0 | 6.1 |

Note: Data are for national administrations only.
Source: "National Summary Report," Advanced Placement Program, The College Board, 1978 through 1990.

Note: Jackknifed standard errors are presented in parentheses.

Table 9: Percentage of Students Scoring 600 or above on the SAT, 1972-1990

| | SAT Verbal | SAT Math |
|---|---|---|
| '72 | 11.4 | 17.9 |
| '73 | 9.7 | 16.7 |
| '74 | 10.0 | 17.2 |
| '75 | 7.9 | 15.6 |
| '76 | 8.2 | 16.3 |
| '77 | 8.0 | 16.1 |
| '78 | 7.9 | 15.6 |
| '79 | 7.7 | 15.0 |
| '80 | 7.2 | 15.1 |
| '81 | 7.0 | 14.4 |
| '82 | 7.1 | 15.3 |
| '83 | 6.9 | 15.9 |
| '84 | 7.3 | 16.6 |
| '85 | 7.9 | 17.1 |
| '86 | 7.9 | 17.9 |
| '87 | 8.1 | 18.3 |
| '88 | 7.3 | 17.6 |
| '89 | 7.8 | 18.0 |
| '90 | 7.4 | 18.4 |

*Source: "College-Bound Seniors, Profile of SAT and Achievement Test Takers," 1972 through 1990, The College Board.*

Table 10: Percentage of Students Scoring 27 or above on the ACT, 1973-1989

| | ACT English | ACT Mathematics | ACT Composite |
|---|---|---|---|
| '73 | 3 | 18 | 11 |
| '74 | 3 | 16 | 10 |
| '75 | 3 | 15 | 9 |
| '76 | 3 | 14 | 9 |
| '77 | 4 | 15 | 9 |
| '78 | 5 | 15 | 10 |
| '79 | 4 | 14 | 9 |
| '80 | 4 | 13 | 9 |
| '81 | 4 | 14 | 9 |
| '82 | 4 | 13 | 9 |
| '83 | 5 | 12 | 9 |
| '84 | 4 | 12 | 9 |
| '85 | 4 | 11 | 10 |
| '86 | 5 | 12 | 10 |
| '87 | 5 | 10 | 9 |
| '88 | 5 | 10 | 10 |
| '89 | 5 | 11 | 10 |

*Source: American College Testing Program, personal correspondence, March 23, 1990.*

Table 11: Achievement Test Data

| | High School Graduates | Achievement Test Takers | Test Takers as a Percent of Graduates | Mean SAT Verbal Score* | Mean SAT Math Score* | Mean Achievement Test Score* |
|---|---|---|---|---|---|---|
| 77 | 3,155,000 | 212,712 | 6.7 | 504 | 553 | 533 |
| 78 | 3,127,000 | 208,844 | 6.7 | 507 | 554 | 531 |
| 79 | 3,117,000 | 201,392 | 6.5 | 508 | 554 | 529 |
| 80 | 3,043,000 | 200,038 | 6.6 | 506 | 557 | 532 |
| 81 | 3,020,000 | 198,922 | 6.6 | 506 | 557 | 532 |
| 82 | 2,995,000 | 196,991 | 6.6 | 510 | 559 | 537 |
| 83 | 2,888,000 | 192,500 | 6.7 | 508 | 564 | 537 |
| 84 | 2,767,000 | 198,433 | 7.2 | 512 | 569 | 537 |
| 85 | 2,677,000 | 203,670 | 7.6 | 516 | 572 | 540 |
| 86 | 2,643,000 | 208,423 | 7.9 | 517 | 576 | 540 |
| 87 | 2,699,000 | 216,420 | 8.0 | 521 | 581 | 544 |
| 88 | 2,801,000 | 224,248 | 8.0 | 517 | 581 | 543 |
| 89 | 2,820,000 | 213,217 | 7.6 | 518 | 583 | 546 |
| 90 | 2,628,000 ** | 200,225 | 7.6 | 515 | 585 | 546 |

*Sources: Data on high school graduates are from, Projections of Education Statistics to 2001: An Update," National Center for Education Statistics, December 1990. SAT and Achievement Test data are from "National Reports of SAT and Achievement Test Takers, College-Bound Seniors," The College Board, 1976-77 through 1990.*

**For Achievement Test takers. The mean Achievement Test score is the mean of the scores for all Achievement Tests taken, which differ from one test taker to another.*

***Based on early estimates.*

Table 12: Trends in Six Achievement Tests with the Highest Volumes

| | English Composition | Math I | American History | Biology | Chemistry | Math II |
|---|---|---|---|---|---|---|
| '77 | 200,539 | 149,918 | 63,111 | 44,897 | 35,009 | 30,497 |
| '78 | 195,173 | 146,426 | 60,687 | 47,291 | 35,007 | 32,743 |
| '79 | 187,266 | 145,572 | 58,005 | 43,002 | 34,159 | 34,513 |
| '80 | 184,714 | 146,172 | 55,987 | 40,580 | 34,473 | 34,990 |
| '81 | 182,939 | 145,851 | 54,717 | 40,480 | 34,494 | 37,592 |
| '82 | 180,637 | 145,277 | 55,167 | 40,246 | 34,888 | 37,603 |
| '83 | 177,359 | 142,306 | 43,572 | 42,544 | 35,728 | 39,093 |
| '84 | 183,639 | 146,693 | 43,871 | 43,166 | 36,419 | 41,702 |
| '85 | 188,811 | 148,254 | 43,233 | 43,341 | 36,177 | 45,890 |
| '86 | 192,498 | 149,562 | 43,866 | 44,990 | 36,999 | 50,261 |
| '87 | 199,051 | 153,781 | 46,918 | 46,821 | 37,262 | 54,095 |
| '88 | 206,515 | 158,779 | 51,105 | 47,282 | 36,657 | 56,553 |
| '89 | 196,352 | 150,460 | 52,451 | 43,823 | 34,163 | 55,681 |
| '90 | 183,451 | 136,999 | 48,943 | 42,737 | 31,727 | 57,052 |

*Source: "National Reports of SAT and Achievement Test Takers, College-Bound Seniors." The College Board, 1976-77 through 1990.*

Table 13: Trends in Mean Scores for the Six Highest Volume Achievement Tests

| | English Composition | Math I | American History | Biology | Chemistry | Math II |
|---|---|---|---|---|---|---|
| '77 | 516 | 547 | 492 | 543 | 574 | 666 |
| '78 | 512 | 541 | 496 | 544 | 577 | 665 |
| '79 | 511 | 537 | 480 | 547 | 575 | 657 |
| '80 | 518 | 536 | 501 | 551 | 573 | 653 |
| '81 | 512 | 539 | 508 | 546 | 571 | 654 |
| '82 | 520 | 545 | 511 | 548 | 575 | 661 |
| '83 | 518 | 543 | 516 | 544 | 569 | 655 |
| '84 | 518 | 542 | 521 | 550 | 573 | 659 |
| '85 | 523 | 540 | 525 | 554 | 576 | 658 |
| '86 | 522 | 541 | 528 | 551 | 571 | 660 |
| '87 | 524 | 548 | 529 | 550 | 574 | 662 |
| '88 | 521 | 549 | 529 | 553 | 577 | 664 |
| '89 | 523 | 548 | 534 | 561 | 576 | 666 |
| '90 | 523 | 548 | 530 | 561 | 574 | 663 |

*Source: "National Reports of SAT and Achievement Test Takers, College-Bound Seniors." The College Board, 1976-77 through 1990.*

Table 14: Trends in Graduate Management Admission Test Scores by Sex and Race/Ethnicity

| | '82 | '83 | '84 | '85 | '86 | '87 | '88 | '89 | '90 |
|---|---|---|---|---|---|---|---|---|---|
| Test-Takers | 139,964 | 128,119 | 114,142 | 131,824 | 137,868 | 146,311 | 148,869 | 153,283 | 162,440 |
| Mean | 481 | 487 | 491 | 493 | 494 | 497 | 497 | 499 | 503 |
| Male | | | 483 | 485 | 489 | 494 | 498 | 502 | 506 |
| Female | | | 470 | 476 | 477 | 475 | 477 | 475 | 479 |
| White | | | 499 | 502 | 503 | 507 | 508 | 511 | 514 |
| Black | | | 379 | 382 | 383 | 384 | 389 | 391 | 397 |
| Oriental/Asian | | | 486 | 487 | 488 | 488 | 493 | 493 | 499 |
| Mex. Amer./Chicano | | | 442 | 446 | 450 | 453 | 452 | 454 | 460 |
| Puerto Rican | | | 394 | 404 | 397 | 402 | 413 | 413 | 419 |
| Native Am./Am. Ind.* | | | 449 | 458 | 463 | 465 | 458 | 464 | 463 |

Note: Mean scores for males and females include the world-wide population of test-takers; all other scores are for U.S. citizens only.

*Sources: "Demographic Profile of Candidates Taking the Graduate Management Admission Test, 1979-80 through 1989-90," Graduate Management Admission Council. "An Admissions Office Profile of Candidates Taking the Graduate Management Admission Test, 1983-84 through 1987-88 (December 1988), 1984-85 through 1988-89 (October 1989), and 1985-86 through 1989-90 (January 1991).*

**Data for Native American/American Indians may not be comparable across years because of changes in the wording of the question.*

Table 15: Trends in GRE General Test Means and Number of Examinees

| | Verbal | Quantitative | Analytical | Number of Examinees |
|---|---|---|---|---|
| '81 | 491 | 534 | | 135,339 |
| '82 | 488 | 541 | 527 | 123,403 |
| '83 | 493 | 549 | 535 | 123,703 |
| '84 | 493 | 549 | 542 | 121,927 |
| '85 | 491 | 552 | 546 | 124,722 |
| '86 | 494 | 557 | 550 | 126,875 |
| '87 | 495 | 556 | 551 | 131,809 |
| '88 | 498 | 564 | 557 | 126,512 |
| '89 | 498 | 566 | 557 | 145,569 |
| '90 | 499 | 570 | 557 | 157,023 |

Table 16: Trends in GRE Subject Test Examinees

| | '81 | '82 | '83 | '84 | '85 | '86 | '87 | '88 | '89 | '90 |
|---|---|---|---|---|---|---|---|---|---|---|
| Biology | 9,133 | 8,312 | 8,094 | 7,736 | 7,834 | 8,451 | 8,253 | 7,257 | 7,555 | 7,701 |
| Chemistry | 3,125 | 2,999 | 3,242 | 3,168 | 3,039 | 2,997 | 2,908 | 2,595 | 2,716 | 2,961 |
| Computer Sci | 1,325 | 1,658 | 1,956 | 2,372 | 2,816 | 3,532 | 3,393 | 2,818 | 3,118 | 2,999 |
| Economics | 1,677 | 1,560 | 1,895 | 1,867 | 1,755 | 1,896 | 1,789 | 1,379 | 1,326 | 1,337 |
| Education | 1,337 | 1,080 | 1,022 | 1,077 | 1,015 | 1,028 | 945 | 769 | 898 | 860 |
| Engineering | 3,818 | 3,813 | 4,296 | 4,404 | 4,318 | 4,509 | 4,620 | 4,050 | 3,883 | 3,626 |
| Geology | 2,139 | 2,274 | 2,885 | 2,475 | 1,897 | 1,592 | 1,085 | 844 | 685 | 642 |
| History | 1,405 | 1,196 | 1,425 | 1,422 | 1,323 | 1,464 | 1,612 | 1,524 | 1,544 | 1,809 |
| Literature | 2,722 | 2,531 | 2,786 | 2,889 | 2,996 | 3,311 | 3,686 | 3,732 | 4,170 | 4,880 |
| Math | 1,573 | 1,549 | 1,860 | 1,960 | 2,163 | 2,191 | 2,124 | 1,969 | 2,041 | 2,181 |
| Music | 1,542 | 1,302 | 1,112 | 1,044 | 970 | 946 | 819 | 772 | 793 | 796 |
| Physics | 1,953 | 1,952 | 2,158 | 2,213 | 2,245 | 2,299 | 2,459 | 2,242 | 2,428 | 2,799 |
| Pol. Science | 1,446 | 1,259 | 1,311 | 1,392 | 1,362 | 1,420 | 1,458 | 1,279 | 1,290 | 1,316 |
| Psychology | 8,722 | 8,862 | 8,795 | 8,810 | 8,693 | 8,977 | 9,567 | 8,889 | 10,076 | 11,175 |
| Sociology | 796 | 646 | 688 | 618 | 543 | 716 | 746 | 642 | 691 | 1,089 |

Table 17: Trends in GRE Subject Test Means

| | '81 | '82 | '83 | '84 | '85 | '86 | '87 | '88 | '89 | '90 |
|---|---|---|---|---|---|---|---|---|---|---|
| Biology | 624 | 624 | 623 | 621 | 618 | 612 | 617 | 614 | 613 | 616 |
| Chemistry | 615 | 615 | 608 | 609 | 612 | 611 | 612 | 606 | 614 | 630 |
| Computer Sci | 611 | 609 | 608 | 604 | 600 | 598 | 606 | 617 | 616 | 631 |
| Economics | 621 | 618 | 604 | 609 | 613 | 593 | 598 | 614 | 622 | 634 |
| Education | 442 | 435 | 433 | 437 | 440 | 441 | 445 | 452 | 448 | 452 |
| Engineering | 599 | 602 | 601 | 606 | 610 | 608 | 608 | 617 | 627 | 622 |
| Geology | 576 | 572 | 570 | 569 | 572 | 570 | 567 | 578 | 578 | 576 |
| History | 509 | 514 | 504 | 508 | 502 | 504 | 503 | 503 | 506 | 501 |
| Literature | 525 | 523 | 524 | 524 | 526 | 518 | 520 | 515 | 517 | 514 |
| Math | 692 | 694 | 674 | 684 | 682 | 668 | 673 | 681 | 681 | 697 |
| Music | 502 | 500 | 495 | 492 | 495 | 486 | 494 | 486 | 492 | 492 |
| Physics | 646 | 639 | 629 | 626 | 623 | 611 | 610 | 614 | 627 | 644 |
| Pol. Science | 469 | 465 | 461 | 459 | 457 | 454 | 453 | 459 | 459 | 456 |
| Psychology | 533 | 531 | 538 | 540 | 537 | 538 | 534 | 534 | 535 | 535 |
| Sociology | 438 | 435 | 430 | 443 | 457 | 436 | 445 | 451 | 443 | 435 |

Note: Years represent testing years, which usually run from October 1 through September 30. E.g., 1981 data are for the testing year of 1980-81.

*Sources: "GRE Test Volumes, Means, and Standard Deviations, 1980-81 through 1989-90, Based on Annual Summary Data for Seniors and Nonenrolled College Graduates," GRE Programs and Services, Educational Testing Service, unpublished.*

Table 18: Trends in the Percentage of 16-24 Year-Olds and 25-34 Year-Olds Enrolled in Four-Year Colleges, by Sex

| | Males 16-24 | Males 25-34 | Females 16-24 | Females 25-34 |
|---|---|---|---|---|
| 73 | 23.8 (0.6) | 3.7 (0.3) | 18.1 (0.6) | 1.5 (0.2) |
| 74 | 23.3 (0.6) | 3.8 (0.3) | 18.6 (0.6) | 1.9 (0.2) |
| 75 | 23.8 (0.6) | 3.9 (0.3) | 19.0 (0.6) | 2.3 (0.2) |
| 76 | 24.4 (0.6) | 3.8 (0.3) | 21.2 (NA) | 2.0 (0.2) |
| 77 | 24.2 (0.6) | 3.8 (0.3) | 19.3 (0.6) | 2.5 (0.2) |
| 78 | 23.4 (0.6) | 3.2 (0.2) | 18.9 (0.5) | 2.6 (0.2) |
| 79 | 23.3 (0.6) | 3.3 (0.2) | 20.0 (0.6) | 2.6 (0.2) |
| 80 | 22.4 (0.6) | 2.8 (0.2) | 19.5 (0.5) | 2.5 (0.2) |
| 81 | 23.1 (0.6) | 3.2 (0.2) | 19.4 (0.5) | 2.9 (0.2) |
| 82 | 23.0 (0.6) | 2.8 (0.2) | 20.1 (0.5) | 2.5 (0.2) |
| 83 | 23.3 (0.6) | 3.0 (0.2) | 19.5 (0.5) | 2.7 (0.2) |
| 84 | 24.2 (0.6) | 2.8 (0.2) | 20.3 (0.6) | 2.9 (0.2) |
| 85 | 24.5 (0.6) | 3.1 (0.2) | 21.2 (0.6) | 2.7 (0.2) |
| 86 | 24.1 (0.6) | 3.0 (0.2) | 21.6 (0.6) | 2.8 (0.2) |
| 87 | 27.2 (0.6) | 2.9 (0.2) | 22.7 (0.6) | 2.8 (0.2) |
| 88 | 25.9 (0.6) | 3.1 (0.2) | 24.3 (0.6) | 2.5 (0.2) |

*Source: "The Condition of Education, 1990, Volume 2, Postsecondary Education," National Center for Education Statistics, pp. 18 & 105.*

Table 19: Trends in the Percentage of High School Graduates Aged 16-24 Enrolled in Two- and Four-Year Colleges by Sex and Race/Ethnicity

| | White Males | White Females | Black Males | Black Females |
|---|---|---|---|---|
| 73 | 35.7 (0.7) | 26.4 (0.6) | 28.4 (2.2) | 22.2 (1.8) |
| 74 | 35.2 (0.7) | 27.5 (0.6) | 31.2 (2.3) | 24.7 (1.9) |
| 75 | 36.9 (0.7) | 29.4 (0.6) | 33.4 (2.3) | 32.0 (2.0) |
| 76 | 35.7 (0.7) | 31.4 (0.7) | 35.9 (2.3) | 32.8 (1.9) |
| 77 | 35.8 (0.7) | 29.7 (0.6) | 33.0 (2.2) | 31.9 (1.9) |
| 78 | 34.3 (0.7) | 29.2 (0.6) | 32.4 (2.2) | 29.3 (1.8) |
| 79 | 33.4 (0.7) | 30.3 (0.6) | 32.0 (2.2) | 29.7 (1.8) |
| 80 | 34.3 (0.7) | 30.8 (0.7) | 27.0 (2.2) | 29.2 (1.9) |
| 81 | 35.1 (0.7) | 31.1 (0.7) | 28.5 (2.1) | 28.8 (1.9) |
| 82 | 34.8 (0.7) | 32.3 (0.7) | 25.6 (1.9) | 25.5 (1.7) |
| 83 | 35.9 (0.7) | 31.2 (0.7) | 27.9 (2.1) | 27.6 (1.8) |
| 84 | 36.8 (0.8) | 31.8 (0.7) | 29.6 (2.0) | 26.7 (1.8) |
| 85 | 36.5 (0.8) | 33.6 (0.7) | 28.0 (2.0) | 25.1 (1.8) |
| 86 | 36.1 (0.8) | 33.3 (0.7) | 28.2 (2.1) | 29.3 (1.8) |
| 87 | 40.8 (0.8) | 36.7 (0.8) | 33.3 (2.2) | 30.9 (1.9) |
| 88 | 41.1 (0.8) | 38.6 (0.8) | 26.2 (2.0) | 32.3 (1.9) |

*Source: "The Condition of Education, 1990, Volume 2, Postsecondary Education," National Center for Education Statistics, pp. 20 & 106.*

Table 20: Trends in the Percentage of 25-29 Year-Old High School Graduates Completing Four Years of College by Sex and Race/Ethnicity

| | Total | Male | Female | White | Black | Hispanic |
|---|---|---|---|---|---|---|
| 70 | 21.7 (.64) | 26.1 (.93) | 17.4 (.75) | 22.2 (.66) | 13.1 (1.79) | NA |
| 71 | 21.9 (.62) | 25.7 (.90) | 18.1 (.74) | 22.5 (.64) | 11.1 (1.63) | NA |
| 72 | 23.7 (.62) | 27.3 (.89) | 20.2 (.75) | 24.4 (.64) | 13.0 (1.67) | NA |
| 73 | 23.6 (.60) | 26.8 (.86) | 20.5 (.73) | 24.2 (.62) | 12.6 (1.60) | NA |
| 74 | 25.3 (.60) | 28.7 (.85) | 21.8 (.73) | 26.4 (.62) | 11.6 (1.47) | 11.2 (2.40) |
| 75 | 26.3 (.59) | 29.8 (.84) | 22.9 (.72) | 27.0 (.61) | 15.0 (1.57) | 16.8 (2.83) |
| 76 | 28.0 (.58) | 32.0 (.83) | 24.1 (.71) | 28.7 (.60) | 17.6 (1.60) | 12.7 (2.34) |
| 77 | 28.1 (.58) | 31.2 (.81) | 25.1 (.71) | 29.1 (.60) | 16.9 (1.52) | 11.6 (2.24) |
| 78 | 27.3 (.57) | 30.2 (.80) | 24.4 (.70) | 28.4 (.60) | 15.2 (1.41) | 17.1 (2.47) |
| 79 | 27.0 (.56) | 29.9 (.79) | 24.2 (.69) | 27.8 (.59) | 16.6 (1.46) | 12.7 (2.20) |
| 80 | 26.3 (.54) | 28.1 (.80) | 24.5 (.72) | 27.3 (.57) | 15.1 (1.31) | 13.2 (2.06) |
| 81 | 24.7 (.52) | 26.6 (.77) | 22.8 (.69) | 25.6 (.55) | 14.9 (1.28) | 12.5 (1.91) |
| 82 | 25.2 (.51) | 27.0 (.77) | 23.4 (.69) | 26.1 (.55) | 15.5 (1.25) | 15.9 (2.03) |
| 83 | 26.2 (.51) | 27.8 (.77) | 24.6 (.69) | 26.9 (.55) | 16.3 (1.26) | 17.9 (2.19) |
| 84 | 25.5 (.50) | 27.1 (.75) | 24.0 (.68) | 26.6 (.54) | 14.7 (1.19) | 16.5 (2.14) |
| 85 | 25.7 (.50) | 26.9 (.75) | 24.6 (.68) | 26.7 (.54) | 14.3 (1.16) | 18.1 (1.94) |
| 86 | 26.0 (.50) | 26.7 (.73) | 25.3 (.68) | 27.2 (.54) | 14.2 (1.12) | 15.3 (1.74) |
| 87 | 25.6 (.50) | 26.1 (.73) | 25.2 (.68) | 26.7 (.54) | 13.6 (1.10) | 14.7 (1.68) |

*Source: "The Condition of Education, 1990, Volume 2, Postsecondary Education," National Center for Education Statistics, pp. 32 & 115.*

Table 21: Trends in the Percentages of Degrees Awarded to Foreign Students

| | Bachelor's | Master's | Doctor's |
|---|---|---|---|
| '77 | 1.7 | 5.5 | 11.3 |
| '79 | 1.9 | 6.5 | 12.0 |
| '81 | 2.4 | 7.5 | 12.8 |
| '85 | 3.0 | 9.6 | 16.5 |
| '87 | 3.0 | 10.3 | 19.4 |

*Source: "The Condition of Education, 1990, Volume 2, Postsecondary Education," National Center for Education Statistics, p. 159.*

Note: Standard errors are presented in parentheses.

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